JUN 16 1913

Number 3
Volume XLV

JUNE, 1913

$2.00 per year
$3.00 with Directory

JUN 16 1913

TEXTILE WORLD RECORD

A JOURNAL FOR MANUFACTURERS AND ALL OTHERS INTERESTED IN THE PROCESSES AND PRODUCTS OF TEXTILE MANUFACTURING

LORD & NAGLE COMPANY BOSTON MASS.

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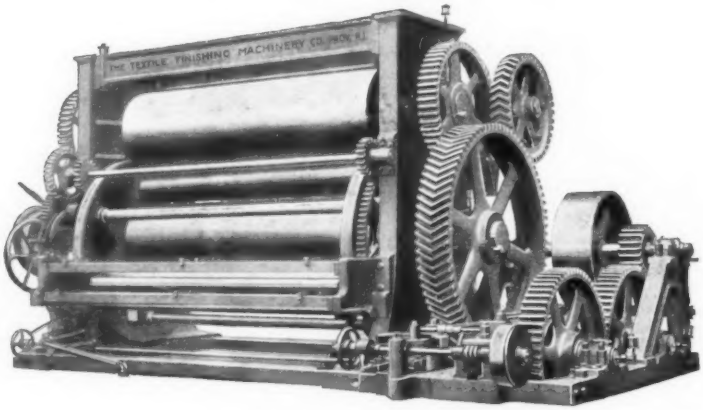

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Correspondence

We solicit correspondence on textile subjects. Articles accepted will be paid for. Name and address must always be given, not necessarily for publication. Subscribers are invited to make free use of our Questions and Answers Department; correspondence is strictly confidential.

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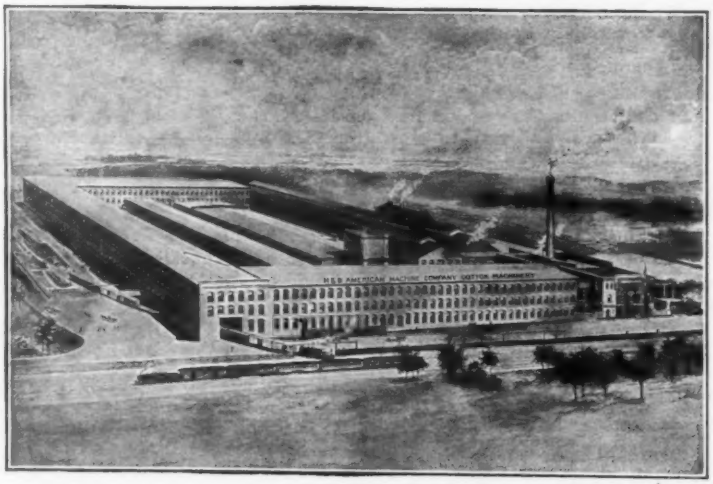

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TEXTILE WORLD RECORD

JUNE, 1913

Monthly Comment.

The Wool Supply

Two prominent worsted manufacturers have recently called the attention of the public to the imminent danger of a shortage in the world's supply of wool. The financial report issued on April 28 by Stoehr & Co., of Leipzig, said to be the largest worsted spinning corporation in Germany and which controls by stock ownership the Botany Mills at Passaic, N. J., contains the following reference to the threatened shortage of wool:

The prices for raw wool and worsted yarn did not go hand in hand in 1912. Yarn prices lagged almost constantly behind those for the raw material. The disarrangement of values was especially marked in the closing months of the year, when it became evident that a serious shortage in the world's wool clip was threatened if the consumption of the staple continued at the present pace for several years. The fears that a shortage of wool will result are based on the serious drouth in Australia during the first half of the year 1912 and on the rapid development of agriculture in the La Plata States, which is forcing the flocks back to the uncultivated lands in the interior. As a result of these changes new and unforseen relations between the supply and consumption of wool will be brought about. The wool manufacturing industry should immediately take into consideration the question of providing ways and means for lessening the danger as to prices from the shortage in Australia and La Plata by developing wool growing in other parts of the world. The example set by cotton spinners throughout the world in their efforts to increase the production of cotton should be followed in the wool manufacturing industry of all countries. A development of this enterprise by the various governments—Germany in her colonies—would be entirely justifiable by reason of the importance of the woolen and worsted industry.

The second warning was given by Julius Forstmann, of Forstmann & Huffmann, also of Passaic, N. J., in his statement before the Finance Committee on May 22. Speaking of the importance of protecting the home supply of American wool, Mr. Forstmann said:

From my experience as a German manufacturer I know that in Germany, where they have no tariff on wool, there is a very strong agitation now among the manufacturers for the German government to take care of wool growing on German territory. I think a moderate tariff on wool in this country would have such effect that in the long run, wool would be cheaper than if you take the tariff off entirely. The wool production is a limited one. There are only two other countries which produce wool to a very great extent. I have been in Australia and South America studying wool growing in these two countries. I know that South America is now going back in its production of wool. They are now growing grain and the sheep are on the decrease in Argentina.

Over six years ago, in our January, 1907, issue, we called attention to the growing scarcity of raw material, which is now realized by wool manufacturers everywhere. Following is an extract from our comment at that time:

There is a scarcity of textile materials of all kinds. The demand for silk, hemp, jute, cotton and wool has advanced the prices of all of these products, and with none of them is the scarcity more serious than in the case of wool. The attitude of the general public and of the textile trade itself toward the wool supply is, however, one of

complete indifference. The trade is, apparently, no more concerned about the scarcity of wool than about the high price of camphor. If there is a shortage of cotton a general alarm is sounded throughout the world; national and international cotton federations are formed to ward off the peril; private and public commissions are sent to investigate old sources of supply; the hat is passed around among rich and poor alike to raise money for finding new sources of cotton supply, which, when found, are straightway subsidized by the government. This development of our wool supply is a work which the government should take up at once. The officials at Washington can find many precedents for it in the extraordinary expenditure of official time and money in studying the cotton plant, operating model cotton plantations, and compiling the great variety of cotton statistics with which we are regularly and irregularly favored at frequent intervals.

The alarm sounded by Stoehr & Co. and Mr. Forstmann comes at a particularly opportune time and from sources calculated to carry conviction. Germany admits wool free of duty, and yet conditions are such as to prompt the largest worsted spinners in that country to call on the German government to adopt what is neither more nor less than protection for wool growing. Protection need not necessarily take the form of a tariff on imports. As applied by Great Britain and Germany to cotton growing it takes the equally effective form of subsidies, guaranteeing a minimum price for cotton and interest on loans for irrigation and railway construction, the free distribution of seed, the building of ginneries, and many other means of direct support by the government. That is what the recommendation of Stoehr & Co. amounts to.

With German manufacturers calling on their government to give direct aid to increase the supply of German wool, it is no time for the United States government to withdraw the protection afforded by a tariff on wool and allow the industry of wool growing to be destroyed in whole or part by new conditions of competition with foreign producers. We have recently called attention at length to the radical character of the change from high specific duties on grease wool to free wool. These specific duties have been prohibitory on a large part of the world's clip and comparatively low on the remainder. To expose an industry developed under these peculiarly abnormal conditions, to competition under free trade would certainly prove disastrous. Such a change would be unjustifiable at any time, and especially now when the need for developing wool growing in all countries is so important. To cite the foreign shortage of wool as a reason for free wool is but the near-sighted selfishness of the man who buys wool, whether dealer or spinner. Let the destruction of the American wool growing industry be followed by the further inevitable shrinkage in the foreign supply, and the American spinners will then find themselves facing a wool famine and the necessity of creating anew what free trade had destroyed. The plain duty of Washington government is to retain a fair duty on wool and then to take measures, similar to those that for years have been adopted by the United States for cotton growing, to develop the growing of American wool.

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Industrial Efficiency at Home and Abroad

During the past month the press of the country has been filled with comments on the greatly superior efficiency of industries in the United States as compared with foreign countries. The discussion was caused by the publication of a report prepared by the Department of Commerce for the Ways and Means Committee. The figures in this report showed that 147 cotton mill operatives in the United States were doing the work (rated by increase in value of product) of 255 operatives in the same industry in Great Britain; that it required 283 woolen and worsted operatives in Great Britain to do the work of 109 in this country; and that 144 knitting mill workers in the United States did as much work, that is, added as much value to the material, as did 312 operatives in the knitting mills of Great Britain. The report was issued about the time the Underwood bill passed the House and was sent to the Senate and the obvious conclusions from such exhibits was that American industries needed no tariff protection.

These figures are amazing, but even greater amazement is caused by reading the

official explanation of the methods by which they were compiled. The report says:

The second group of questions proposed by the committee has to do with the general subject of competitive industries abroad. The published information on this subject is unfortunately far from complete, and much of the information available for different countries is not directly comparable. To work over the results so that they might serve as a basis for drawing general conclusions would require far more research than has been possible in the time allowed with the limited number of persons who could be assigned to the task. It is therefore impossible to give a comprehensive answer to several of the questions.

"I confess, my brethern," said the controversial divine, "that there is a difficulty here; but let us look it boldly in the face, and pass on." The Department of Commerce after admitting that there were no fairly comparable statistics of foreign and American efficiency, did pass on to the work it has been called upon to do for the Ways and Means Committee, supplying information that did not exist. Here is how it was done: Great Britain had never taken a census of manufactures previous to 1907, and the first one, compiled in that year, was so deficient and so full of errors as to arouse a storm of protest. Our Department of Commerce took that census for the British part of its exhibit. The preliminary report of the Canadian census of 1911 had recently been issued, as had the 1910 census of manufactures in the United States. It was a case of these three sources of information or nothing. So the Department tries to make the best of a bad matter:

Notwithstanding many important differences in method, the general results would seem to be fairly comparable and it is believed that the comparison of those returns, which is included in this report, will give a more accurate indication of industrial conditions in the three countries than has been heretofore possible.

The difference in market value prevents any fair comparison of the number of operatives for a fixed unit of value added by manufacture. The report says:

Aside from the differences in census methods, already discussed, variations in the general price level in the different countries influence largely the value added by manufacture. This factor tends to enhance the value returned in the United States and Canadian censuses as compared with that returned in the British census.

Having looked that difficulty boldly in the face the Department of Commerce passes on to the next one:

The item of wage earners in the three censuses is fairly comparable, and likewise the amount of wages paid in the United States and Canada. For the United Kingdom, however, there are no census returns of wages.

"There are (sic) no census returns of wages." Here is a difficulty that seems insurmountable, but there is apparently no limit to the statistical resources of a government department charged with the duty of giving a Ways and Means Committee the information needed to back up a Democratic revision of a protective tariff. There is no census of British wages, but the Department of Commerce supplies the void by going back six years and dragging out a report by the British Board of Trade on earnings and hours of labor in the United Kingdom in 1906. Here is the way the Department smooths out the statistical wrinkles and winds up with the official "it is believed".

In the British census no wage statistics are given. For 1906, however, the Board of Trade made a series of elaborate investigations into the general subject of earnings and hours of labor. A number of the more important industries were investigated separately and returns were obtained from the establishments employing a large proportion of the wage earners in each group of industries. The returns showed, among other items, the average number of employes for the last week in each month and the annual expenditure for wages made by each establishment. While no general average of wages for all industries can be given, it is believed that the figures for each separate industry may be safely used for comparison with the corresponding census returns of the United States and Canada.

And here is the way the six-year old figures from the British Board of Trade report are united with the Canadian and United States census data:

The average amount of wages paid for every $1,000 of value added by manufacture has been calculated, in the case of the United Kingdom, from the number of wage earners shown in the census of production and the average wages shown in the investigation into earnings and hours of labor.

The results of such statistical juggling are the amazing figures of foreign and American efficiency to which we have referred. Secretary of Commerce Redfield has had much to say for a number of years regarding the evils of a protective tariff and the value of industrial efficiency. Would it not be well for him to apply his precepts in the regulation of the statistical work of his department?

Mill Stocks of Cotton

The International Cotton Federation's report of mill stocks of cotton on March 1, 1913, covers returns from mills with 126,714,982 cotton spindles, or 89 per cent. of the 142,186,308 spindles in all countries. The figures for foreign countries compared with previous reports of the Federation are as follows:

STOCKS AT AMERICAN MILLS

Date	Returns, Spindles.	Bales on hand.	Bales used per week.	Stocks will last
Aug. 31, '05	23,687,495	776,801	82,288	9.4 weeks
Aug. 31 '06	25,250,096	688,312	94,413	7.3 weeks
Aug. 31, '07	26,242,000	996,000	95,904	10.4 weeks
Mar. 1, '08 est.	27,000,000	1,089,119		
Aug. 31, '08	27,846,000	596,000	87,981	6.4 weeks
Mar. 1, '09	27,846,000	1,831,800		
Aug. 31, '09	27,783,000	908,000	97,788	9.3 weeks
Mar. 1, '10	28,000,000	1,674,000		
Aug. 31, '10	28,349,000	518,000	90,519	5.7 weeks
Mar. 1, '11	28,500,000	1,525,000		
Aug. 31, '11	28,872,000	523,000	90,308	5.8 weeks
Mar. 1, '12	29,522,597	1,543,000		
Aug. 31, '12	30,313,000	871,000	103,231	8.4 weeks
Mar. 1, '13	30,579,000	1,958,000		

The figures for the United States, which are supplied to the Federation by Bureau of the Census, are as follows:

STOCKS AT FOREIGN MILLS

Date.	Returns, Spindles.	Bales on hand.	Bales used per week.	Stocks will last
Aug. 31, '05	46,726,929	935,237	103,269	9 weeks
Mar. 1, '06	54,297,537	1,237,120		
Aug. 31, '06	66,072,303	1,210,610	145,603	8.3 weeks
Mar. 1, '07	71,054,503	1,911,071		
Aug. 31, '07	74,279,078	2,368,410	190,811	12.4 weeks
Mar. 1, '08	78,984,106	2,342,127		
Aug. 31, '08	83,371,883	2,132,045	215,472	9.9 weeks
Mar. 1, '09	85,906,697	2,425,127		
Aug. 31, '09	88,188,004	2,275,392	222,740	10.2 weeks
Mar. 1, '10	91,154,411	2,492,688		
Aug. 31, '10	91,124,025	2,005,786	236,990	8.4 weeks
Mar. 1, '11	93,726,091	2,641,688		
Aug. 31. '11	92,405,197	2,096,052	252,365	8.3 weeks
Mar. 1. '12	94,041,529	2,657,413		
Aug. 31, '12	96,424,132	2,998,540	278,142	10.8 weeks
Mar. 1, '13	92,985,126	2,811,535		

The collection of these statistics by the International Federation is a most useful work, the value of which can never be fully estimated. Combined with the reports of the visible supply of cotton, they give the cotton trade accurate information regarding the available supply, and thus reduce the opportunity for false reports, on which gambling and price manipulation thrive. It is much to be desired that the 15,471,326 spindles for which returns are not received be included in future reports to make the statement complete. Of the missing spindles, 7,346,563 are located in Great Britain

Large Profits in Artificial Silk

At the annual meeting of the Vereinigte Glanzstaff Fabriken at Elberfeld, a dividend of 40 per cent., payable on May 5, was declared. The management reported a falling off in the demand for artificial silk for dress trimming, but that this was more than made up by the increase in the orders from other sources. The French branch of the company had paid a dividend of 22 1/2 per cent.; and the Austrian, 10 per cent. Two years ago the parent company in Germany declared a stock dividend of 100 per cent., so that last month's dividend of 40 per cent. is equal to 80 per cent. on the capital stock ($600,000) before the stock increase. The company has quick assets of $1,800,000. The board of directors announced that the question of a stock dividend would be settled at a general meeting of the corporation in the near future.

How Free Trade Works in Australia

We recently received the following letter from a cotton mill in Australia:

March 20, 1913.

Dear Sirs: With reference to enclosed account for subscription, will you please discontinue sending the Textile World Record as we have been obliged to close our cotton mills through lack of protection. We are, yours faithfully,

The Australian tariff on cotton goods is as follows: Yarns from the United Kingdom, 10 per cent. ad valorem; from other countries 15 per cent. Cloth from the United Kingdom, admitted free; from other countries, 5 per cent. ad valorem. The mill whose letter we give above is the victim of free trade, for the 10 per cent. duty on cotton yarn is useless for protection so long as cotton cloth is admitted free of duty. The natural tendency under free trade is to concentrate manufacturing in congested centers of population like Lancashire and to keep the population of undeveloped countries bound to the soil, a condition that operates to the disadvantage of both sections. A protective tariff provides the remedy for this evil by diversifying the occupations of the people.

The Revision of the Textile Schedules

The Underwood bill as framed by the Ways and Means Committee, revised by President Wilson and approved by the Democratic caucus, was passed by the House of Representatives on May 8 by a vote of 281 yeas to 139 nays. Upon reaching the Senate the bill was referred to the Committee on Finance and assigned in sections to a number of sub-committees. Following is the notice sent to manufacturers throughout the country, with the forty-five questions propounded by the majority members of the Committee and by Senator La Follette:

INTERROGATORIES PROPOUNDED TO MANUFACTURERS

United States Senate—Committee on Finance

If answers to the subjoined interrogatories by manufacturers or by persons who have filed briefs or who have made written or oral protests with the Committee on Finance relating to the provisions of H. R. 3321 are received by the committee before that bill is reported back to the Senate by the Committee on Finance or before final action on it by the Senate, they will be printed for the use of Senators, but neither the report of the bill to the Senate nor final action by the Senate on the bill will be delayed for answers by those to whom these interrogatories are sent.

It is suggested that those who desire to answer shall answer each interrogatory separately and as fully as the information in their possession will permit and at the earliest practicable date and forward the same to the committee.

All interrogatories are required to be answered under oath and when answered by corporations shall be made under oath by the president, or by one of the principal officials of the corporations designated by him for that purpose.

The following questions are propounded by the majority members of the Committee on Finance:

1. What is the name, nature, and use of the commodity you produce?

2. What are the raw materials used in its production? State exact nature of material used.

3. Are the raw materials used by you produced in this country or imported? If imported, in whole or in part, whence are they imported, and what proportion of the whole is imported?

4. What is the cost per unit of the raw material of your product?

5. Give also, if you can, the cost per unit of raw material of this commodity in foreign countries? State figures for each country.

6. What part of your production of this commodity do you export? To what countries and in what quantities and values and what rates of duty are paid at the several foreign ports of entry?

7. Are you interested in any other concern exporting this commodity? If so, give name, amount of product exported, and the actual selling price of this product here and abroad.

8. What were the wholesale prices charged by you and by any concern in which you are interested for this commodity in the domestic market, and what were the prices charged by you and any concern in which you are interested for this commodity when sold in foreign markets during the first four weeks in January, first four weeks in April, first four weeks in July, first four weeks in October, 1912, and the first four weeks in January, 1913?

9. What was the cost of transportation of your product from your factory to the principal foreign markets, giving the names of markets for the periods specified in question 8?

10. What country or countries are your chief competitors in the sale of this commodity in the foreign markets to which you export?

11. Is there a tariff differential for or against you in any of the countries to which you export this commodity?

(a) If so, what is the amount of such differential?

(b) What rates of duty have you paid?

12. How many concerns are engaged in the manufacture or production of this commodity in this country?

13. Who are the principal producers?

14. Are any of these producers organized into a trust or combination to control the price or output, or for any other purpose, and have you any connection or interest, directly or indirectly, in such trust or combination?

15. What proportion of the production of this commodity in this country is produced by such trust? What proportion by the independent producers?

16. Is there any difference in the price charged for this product in the domestic market by the independent producer and the trust producer?

17. What were your wholesale prices f. o. b. factory of this commodity sold in the United States during the first four weeks in January, first four weeks in April, first four weeks in July, and first four weeks in October, 1912, and the first four weeks in January, 1913?

18. What were your wholesale prices of this commodity f. o. b. factory for export in foreign countries during the periods mentioned in question No. 17?

19. What was the cost of production in your plant per unit of your product for the fiscal years 1910 and 1912? Give cost of materials, labor, overhead charges, and depreciation charges in separate items and in as much detail as possible. In this connection, give capitalization as follows:

(a) Amount of common stock issued.

(b) Amount of preferred stock issued.

(c) Amount of bonds issued.

(d) Amount of actual cash or its equivalent in property received in consideration of the stocks and bonds given above.

(e) Rate of dividend paid on preferred stock.
(f) Rate of dividend paid on common stock.
(g) Rate of interest borne by bonds.
(The above three items—(e), (f), and (g)—should cover each year for the past 10 years.)
(h) How much of your earnings for each of the years 1910, 1911, and 1912 have been credited to surplus and how much have been devoted to additions to the plant?
(i) Salaries paid during each of the foregoing years to each of your principal officials.
(j) Statement of assets and liabilities, 1910, 1911, and 1912.
(k) Comparative balance sheet for the years 1910, 1911, and 1912.

20. Give the value for which the property shown in the above statement of assets and liabilities was assessed for taxation in 1912.

21. Give transcript of your labor roll for the periods covered in questions Nos. 17 and 18. Let the transcript show separately:

(a) Skilled laborers.
(b) Unskilled laborers.
(c) Men.
(d) Women.
(e) Children of minimum age, stating the minimum age prescribed by your State law.
(f) Native born.
(g) Foreign born.
(h) Number who are citizens.

22. State amount of wages paid per annum for the years 1910, 1911, and 1912, and total value per annum of your product for the same years.

23. State the character, quality, and age of the machinery used in manufacturing your product.

24. What is the total cost of production per unit of the same products as yours in competing countries? In answering this question give the exact source of your knowledge or information.

25. What is the percentage of labor cost to the total cost of a unit of product in competing countries? In answering this question, give exact source of your knowledge or information, stating the countries separately.

26. Give the cost of transportation from your factory to the principal markets in this country, naming the markets.

27. What is the cost of transportation from the principal points of production in competing countries to the markets in this country? In answering this question, give the names of competitive countries.

28. What part of the duty under the Payne-Aldrich law represents your profit as a manufacturer?

29. Have you a pecuniary interest in the maintenance of a high-tariff rate on this commodity?

The following questions are propounded by Senator La Follette, a minority member of the Committee on Finance, on behalf of the minority members of that committee:

1. What is the nature and use of the commodity which you produce?

2. What are the raw materials used in its production?

3. What is the amount of the production of this commodity in this country?

4. What is the amount of the consumption of this commodity in this country?

5. How many concerns are engaged in the manufacture of the commodity under consideration?

6. Who are the principal producers?

7. What are the ruling market prices of this commodity in this country?

8. What are the ruling market prices of this commodity in competing countries?

9. What is the total cost of production per unit of product in this country?

10. What is the total cost of production per unit of product in competing countries?

11. What is the percentage of the labor cost to the total cost of a unit of product in this country?

12. What is the percentage of the labor cost to the total cost of a unit of product in competing foreign countries?

13. What is the cost of transportation to the principal markets in this country from the principal points of production in this country?

14. What is the cost of transportation to the principal markets in this country from the principal points of production in competing foreign countries?

15. What part of the existing duty represents the difference in the cost of production between this and competing foreign countries?

16. What part of the existing duty represents the profit of the American manufacturer?

Many briefs on the textile schedules have been filed with the Committee and will, it is understood, be published when the bill is reported to the Senate. A few of these have already been made public. F. C. Dumaine, treasurer of the Amoskeag Mfg. Co., presented a brief on the tariff on ginghams, in which changes were recommended, the calculations being based on the Tariff Board's estimates of cost of cotton goods. The brief is in part as follows:

The report of the Tariff Board contains a table, No. 215, pages 744 to 789, giving the details of construction of more than 1,200 fabrics representing almost the whole cotton industry, and in this table is shown the percentage of the cost of cotton (or material) and the percentage of cost of converting the cotton into cloth for all these fabrics. In this table, No. 215 the different cloth constructions are arranged in groups according to the classification of the tariff of 1909, but the percentage of the duty under H. R. 3321, to cost of conversion can be in all cases readily ascertained and compared.

Such a comparison in the case of plain grey goods of all ordinary numbers and, also, of ginghams is given below and from this it can readily be seen that the duties on ginghams are much less compared with conversion cost than on the plain goods.

Grey Cloths

A: 25 samples containing no yarns finer than No. 19. Conversion cost, average 24.7 per cent. Duty (H. R. 3321) 10 per cent., 40 per cent. of conversion cost.

Yarns between No. 19 and No. 39

B, C, E, F, L: 469 samples. Conversion cost, average 30 per cent. Duty (H. R. 3321) 12 1/2 per cent., 41.66 per cent. of conversion cost.

Yarns between No. 39 and No. 59

K: 50 samples. Conversion cost, average 41.1 per cent. Duty (H. R. 3321) 17 1/2 per cent., 42 1/2 per cent. of conversion cost.

Yarns between No. 59 and No. 99

H and L: 215 samples. Conversion cost, average 46 1/2 per cent. Duty (H. R. 3321) 22 1/2 per cent., 48 1/2 per cent. of conversion cost.

Ginghams—Colored Yarns above 19s or Ginghams (Plain Weave).

F1: 12 samples. Page 760, Tariff Board Report. Samples 515 to 526.

Yarns 19 to 39

Conversion cost, average 50.2 per cent. Duty (H. R. 3321) 15 per cent., 30 per cent. of conversion cost. Duty should be proportionately at least 21 per cent.

Drop Box Loom Work—(Checks and Plaids)

F2: 15 samples. Page 762 Tariff Board Report. Samples 554 to 556.

Yarns 19 to 40

Conversion cost, average 56.7 per cent. Duty (H R. 3321) 15 per cent., 26 per cent. of conversion cost. (Duty should be proportionately at least 23.6 per cent.)

Comparing gingham conversion costs and duties with the rates on common grey goods, we find on the 469 samples of grey goods that the proposed duty in H. R. 3321 is 41.66 per cent. of the conversion cost. 41.66 per cent. of conversion cost applied to ginghams would call for at least a duty of 21 per cent. in the Bill, instead of 15 per cent. on samples given in group F1, Nos. 515 to 526, and of at least 23.6 per cent. on Group F2, samples Nos. 554 to 568.

By following the proposed duties under H. R. 3321 on the various grey cloth constructions in use in the United States as given above, it is noted that the new duties run to 40 per cent., 41 2/3, 42 1/2 and 48 1/2 per cent. of the conversion costs of different grades.

On ginghams the duties are only 26 per cent. and 30 per cent. of conversion costs. The modification of this clear inequality is requested. The colored yarn goods are equitably entitled to a higher duty as given.

Manufacturers of colored yarns coarser than No. 19, like tickings, denims, etc., are given duties of 35 per cent. to 37 per cent. of conversion cost, as shown below.

Colored Yarns below 19s (Tickings, Denims, Stripes, etc.)

B: 20 samples. Conversion cost, average 34.1 per cent. Duty (H. R. 3321) 12 1/2 per cent., 37 per cent. of conversion cost.

E: 60 samples, 14 with yarns above 19s. Conversion cost, average 36.1 per cent. Duty (H. R. 3321) 12 1/2 per cent., 35 per cent. of conversion cost.

We therefore request that, to properly make this modification, the following changes be made in H. R. 3321, Paragraph 257, Page 65, Line 11, strike out the words "Jacquard figured".

Line 12, strike out "2 1/2 per cent." and insert "5 per cent.".

And add after the word "thereon" (line 13) the following words:

"Provided that cotton cloth of fancy or figured weaves of any description, cords, stripes, checks, plaids, figures, kindred weaves, and leno weaves; and cloth composed wholly or in part of any of the foregoing, shall pay a duty of 5 per centum ad valorem in addition to all foregoing rates on cotton cloths provided for by this paragraph."

Although the cost of dyeing and finishing of grey goods has nothing whatever to do with the cost of dyeing yarns for ginghams and finishing the goods after weaving; the report of the Tariff Board above quoted has been made the basis for the assertion that dyeing and finishing can be done as cheaply here as in England; and we have therefore thought it necessary to notice it. Now we could not do dyeing and finishing as cheaply here as abroad, even if the duties now placed on dyestuffs were removed; but assuming for the sake of argument that we could do so, and that the cost of these processes should therefore be deducted from gingham conversion cost before computing an equitable duty on them; our position would be in no way changed.

In no gingham mill is the cost of dyeing the yarns and finishing the cloth more than 1/5 or 20 per cent. of the total cost of conversion.

Making this deduction we find in plain ginghams, F1 that the cotton could be left 55 1/2 per cent. and the conversion 44 1/2 per cent. of the total.

In box loom ginghams, F2 the cotton and conversion would be 50 per cent. each.

The higher cost (exclusive of coloring and finishing) of making ginghams, or higher cost of "conversion" compared with grey goods of the same count and numbers of yarn, is due to the added difficulty of handling and making up patterns in colored yarns, necessitating extra processes, greater care, and slower running, and more complicated machinery.

Compared with 469 common grey cloth samples the duties on the two gingham groups should be under H. R. 3321:

F1: 41 2/3 per cent. of 44 1/2	18.50
Add for coloring	2.50
	21.00
F2: 41 2/3 per cent. of 50	20.83
Add for coloring	2.50
	23.83

Ginghams should not be compared with grey goods referred to by Tariff Board in table 156.

page 502, which table only refers to samples of grey goods that have been dyed, bleached or printed. Ginghams of the 100 samples do not appear in table 156.

The gingham samples are among samples Nos. 71 to 89 which are not finished or compared.

A delegation headed by Simeon B. Chase, and representing the cotton manufacturers of Fall River, Mass., recommended important changes in the Underwood cotton schedule. Their brief has not been made public, but the following outline of the recommendation has appeared in the press reports:

Elimination of the suggestion of the American Cotton Manufacturers' Association that 2 1/2 per cent. additional duty be assessed on "printed, painted, jacquard, figured, bleached, mercerized" and other finished goods. It is claimed that sufficient protection on these goods is provided by ad valorem rates drawn on a proper basis.

Cloths are taxed on their yarn content; agreeing with the Underwood bill in this respect.

Rates will not exceed 40 per cent. on some of the highest priced fine novelty fabrics.

More equitable sub division on yarn suggested.

Different rates are provided on plain and fancy weaves; following the suggestion of the Tariff Board report.

Provides for equitable competitive basis for all yarns and all cotton products, and not for a small portion of them as is claimed to be the case with the Underwood rates.

Wide variation of conversion costs between coarse ply yarn and coarse plain weaves. Two and three ply sheeting and fine duck is given an equitable production with sheetings and other coarse materials.

Provisions are made in the yarn paragraph for divisions ten numbers apart up to 120s, instead of jumping from 20s to 30s and from 60s to 90s. It is claimed this will permit competition, but will not invite destruction of the yarn industry.

Several important suggestions relative to the Administrative features affecting the cotton schedule are offered, but a retention of the ad valorem basis is included in the proposed schedule.

The new schedule divides the product into plain and fancy weaves and provides different rates therefor. It suggests the adoption of administrative measures presented in a recent issue of the "Textile World Record". It retains the advantages of taxing cloths by their yarn contents, just as the Underwood bill suggests.

The above press report indicates that the Fall River manufacturers have adopted the suggestion made by us in our March issue that the ad valorem duties increase with the yarn count at a uniform rate. The Fall River suggestion is that the changes be made at intervals of 10 yarn numbers, while our suggestion was to have the rate increase with each number. It is very gratifying to have our plan adopted in principle by so important a body of manufacturers, and we feel confident that, after the question has been studied thoroughly, there will be a general agreement with our suggestions for the revision of the cotton schedule. The progressive plan, based on the yarn count, which we proposed in March for the ad valorem rates on cotton yarn and cloth, has long been in force for specific rates on cotton and silk yarn, and no valid objection has been advanced to its adoption at the present time.

William Whitman, Boston, Mass., made a statement before the Finance Committee on May 23. His brief is in part as follows:

If a wise and salutary law can be passed, the sooner it is enacted the better it will be for manufacturers, producers in other lines of industry, and consumers. There is no more serious impediment to industrial activity and to commercial prosperity than the uncertainty that is inevitable while tariff rates on imported goods competing with our own productions are under discussion. Home manufacturers, however, should be allowed reasonable time after enactment to adjust themselves to the changed rates and conditions under which they must compete with foreign rivals.

The ability to supply the home market has heretofore been maintained by a tariff sufficiently high to induce capital to go into the industry. But it is not to the advantage of manufacturers that the rates of the tariff should be too high, for the effect of an excessive tariff is to cause too rapid a development of industries and too great an increase of producing plant, with consequent excessive competition and unprofitable selling prices resulting in unstable and intermittent employment of labor and capital. It is therefore not merely conceded, it is desired, that all unnecessarily high rates be reduced.

I conceive that two principles should underlie fundamentally every tariff law, upon whatsoever economic theory it is based:

First: Equality of opportunity. It should be framed neither for the benefit of any special interests, nor with hostility to any legitimate industry, however loud the popular clamor of the moment against it. That is a proposition that needs no argument to support it, no addition to develop or explain it.

Second: Stability and equity. It should be the aim of the framers of a tariff act to fix the rates with such broad, conservative, and reasonable regard for the interests of all concerned—manufacturers, as well as consumers of goods,—as will ensure the continuance of the tariff for a considerable number of years, indefinitely in fact, until the conditions have changed which originally made the act a wise one. Permanence and stability are essential to the success of any tariff measure, and to the general welfare. If the law be wisely made, it will stand. If it is inequitable,

oppressive, destructive, it will be repealed. It will operate injuriously while it is in force; it will lead to derangement of business while the agitation for a new law continues; it will give place to a reactionary measure, as bad perhaps in its effects as that which it replaces.

Coming now to the single industry of the wool manufacture, I wish to point out one or two provisions of the bill now before you that I deem seriously injurious.

The present depression in industrial conditions is greater in that manufacture than in any other. It is caused by apprehension as to the effect of the radical reduction of rates that is proposed. Business in woolen goods is practically at a standstill.

A part of the proposed reduction is nominal, owing to the provision placing wool on the free list. But the existing rates on wool manufactures are in effect cut more than two-thirds. It would therefore be necessary that more than three times the current importations of woolen and worsted goods should be entered at the custom-houses in order to produce the revenue now realized, with a resulting displacement of an equivalent amount of goods of home manufacture. The proposed rates on woolen manufactures are 30 per cent. lower than those imposed by the Wilson Tariff of 1894, which was so disastrous to the industry.

In view of the greatly increased scale of wages and lessened hours of labor that have taken place since 1894 in this country, it would not be possible for such unprecedented reduction of rates as is proposed to be unattended with grave disaster.

In the Bill before you ad valorem rates have been substituted for specific and compound rates imposed by the existing law. I understand this substitution to be irrevocable. Permit me, however, to direct your attention to the danger of such substitution and to suggest that it necessitates the most careful consideration of full ad valorem rates to safeguard the industry. It opens the door wide to undervaluation and fraud —offences which have always been difficult to detect and impossible to prevent. It is evident even to the untrained mathematician that ad valorem rates subject the American manufacturer to the consequences of fluctuations abroad. Every change in the ratio between the cost of the raw material and the selling price of the finished product must necessarily raise or lower the amount of duty and affect its application to the labor and other conversion cost of those products. The duty is levied upon the sum of the cost of raw material, the conversion cost, and the selling cost and profit of the foreign manufacturer—that is, on the export price of the goods. If the price of the raw material declines, the duty declines automatically The ratio of the conversion cost to the total cost of goods is higher in this country than it is abroad, and since it increases as the price of raw material declines, a fixed ad valorem duty becomes, so far as the American manufacturer is concerned, a highly variable rate, and a source of vexation, frequently a bar upon his ability to compete on fair terms with the foreign rival.

I cannot emphasize too strongly the danger and unfairness of determining the percentage of duty to be applied with reference to importations under the present laws as such imports represent a value far in excess of the average value of the foreign goods which can be imported under the reduced rates proposed.

Permit me also to state that these dangers are intensified by the application of a fixed flat rate to each class of manufacturers, say tops, yarns, cloths, etc. This is illogical and at variance with the system adopted in fixing rates in other schedules such as "I" and "J". There are also gradations in rates in schedules "B" and "E".

There is good reason for such graded rates in the schedules referred to, and there is equally good reason for corresponding differences in schedule "K", in the rates which should be assessed on tops, yarns, cloths, etc., of varying degrees of fineness and value. This reason is that no rate of duty can put the American manufacturer upon a competitive basis with the foreign manufacturer which does not make the latter pay to the government an amount at least equivalent to the difference in costs of conversion in this country and abroad. It is an obvious fact that the conversion cost increases both here and abroad in passing from the coarser grades of material or cloth up through the higher grades of more complex and diversified manufacture. Our experience has shown also, and we think it is borne out by the report of the Tariff Board on Schedule K that the English cost of conversion is about one-half of the American cost, i. e., the American cost is at least 100 per cent. more than the English cost. The American cost is even greater relatively than that in some other foreign countries. Furthermore, this difference in relative costs of conversion exists in the same or greater degree in each added process. In other words, with each increase of $1 in foreign conversion cost there is an increase of $2 in American cost. It needs no argument to show, therefore, that the application of the same rate upon all grades of the same kind of manufactures must have a different effect with each change in cost of conversion.

The fallacy in having a single flat rate is due to the fact that whereas the apparent intent is to make the foreign manufacturer pay in duty the difference in dollars and cents between the American and the foreign costs of conversion, the percentage of duty necessary to bring that about must be determined by the ratio between the difference between those costs of conversion and the foreign price, and this ratio must constantly change with each increase in cost because with the same cost of raw material and the cost of conversion constantly increasing, the cost of conversion is constantly becoming a relatively larger and larger factor in the value of the goods. A further reason for the constant change in ratio is that the American cost of conversion increases twice as fast as the English cost.

For instance, an ad valorem rate of twenty per cent. collected on an added $1 of English cost of conversion would merely add twenty cents to the amount paid by the Englishman, whereas the American manufacturer would have expended $2

on the same process of manufacture, or eighty cents more than the Englishman's added cost plus the duty. This is true with every class of wool manufactures and if it is the intent to leave American manufacturers on a competitive basis with the foreign manufacturers on anything except the very lowest grades of goods, it is beyond question that there must be a classification of rates with an increase as the processes of manufacture grow more complex and costly.

Reference was made in our May issue to the Daily Trade Record's investigation of the effect of the tariff revision on the Canadian woolen industry, and an extract from the first article was made. This investigation was made at an opportune time and the report is a valuable addition to the tariff discussion. The results of the inquiry were summarized in the concluding installment as follows:

SOME RESULTS OF THE INVESTIGATION

Briefly, the most important points developed by the investigation were, in part:

That on cassimeres, coatings and flannels English manufacturers could be expected to import heavily into the States, and that on shoddy and shoddy manufactures that the English manufacturers were regarded as in a class by themselves; that it was practically impossible to attempt to profitably compete with them for this business.

That, while in 1885 there were 241 mills turning out woolens and worsteds in the Dominion that since the revision of 1898, for various causes 163 of these concerns have abandoned the business, leaving but 78 in operation. Many of these devote more effort to producing knit goods than woolens or worsteds.

That in consequence of the changed tariff which practically destroyed the industry, that child labor has become so scarce that practically all mills in Canada are now employing men and women to do the same work performed by children in the States with a correspondingly higher wage.

That there has been no indication since 1898 of English or other foreign manufacturers of men's clothing invading the Canadian field while, on the other hand, the manufacturing clothing industry has improved. Book business today is affecting merchant tailoring.

That in consequence of the American field with 90,000,000 population being open to world manufacturers that many believe English manufacturers will direct their energies in this direction, abandoning to an extent the Canadian field, which provides for the demand of but 7,000,000 souls.

That, while many Canadian mills turned to the manufacture of knit goods as a result of the tariff of 1898, that this condition cannot prevail in the States, and that there is more knit goods machinery here now than could be profitably operated at full time.

That it was impossible to expect to compete with English mills for goods selling up to 75 cents a yard and on staples, including serges up to $1.25 a yard.

That Belgium and Germany produced novelty cloths selling at about $1.25 a yard which could not be duplicated in this country for anything like that money.

That the English measure of 37 inches and over to a yard would probably prove embarrassing to American manufacturers who have always held the 36 inch measure.

That, while some of the smaller American mills might be seriously affected by the proposed tariff changes and that, while some mills without sufficient financial support might be crippled, that Canadians believe the larger mill organizations will be able to successfully weather the change and that after a year or so will profitably operate.

That it is impossible for a Canadian or an English clothing manufacturer to turn out ready-made garments with anything like the style and snap that characterize the American ready-to-wear clothing industry.

That there is a field, and may be a larger one, in the Dominion for novelty cloakings turned out in the States and upon which deliveries can be made in about 60 days.

That American mill men may be compelled to specialize upon certain lines to meet this phase of English manufacture.

That American mills may be compelled to advance their openings about three months, unless they expect to do a "follow-up" business starting from English styles.

That American designers and stylists may have to become original and not copyists.

That Canada has found it impossible to extend the woolen and worsted industry under the present tariff and that efforts are being made to secure increased protection for the industry.

That English mills will not "stand" for American methods of cancellation, and that in England "an order is an order."

REVISING THE TARIFF BY ALGEBRA

Bath, S. C., April 5, 1913.

Editor Textile World Record:

Referring to "The Yarn Count as a Basis for the Cotton Cloth Tariff," reprinted from your March issue, and in which a comparison is made between the plan of sudden jumps or steps, as advocated for Classes 1 and 2, and the suggested uniformity of the ascending line or grade, the following comments are prompted, although the entire question is doubtless already settled in detail.

The chart, as plotted in your article, would indicate that the steps or divisions could be adjusted to a parabola, with advantage, but, as cotton yarns rapidly approach the limits, there would be no practical need of

using such a curve for deducing proper ordinates.

As the limits of the yarns are rather narrow after all, it would appear that the best and only absolutely fair means of fixing upon just rates, between determined limits, would be through straight line equations, as you suggest.

Admitting fully the justness of his criticisms of the Bureau of Standards in this matter, and accepting your suggestions as to the straight line process, would it not be a good idea to go a trifle further than the one arbitrary straight line and take other matters into consideration?

The total cost of ordinary cotton cloth in the gray is made up of the total costs of manufacturing, stock, supplies and other materials, insurance, taxes, interest, depreciation and overhead charges. With the exception of the weaving cost, all other items of cost can be based upon the weight or number of the yarn in the cloth.

The weaving cost will vary with the construction of the cloth, and in an average plain cloth it might be assumed for an example that the weaving cost will amount to about one-fifth of the total cost, aside from the stock.

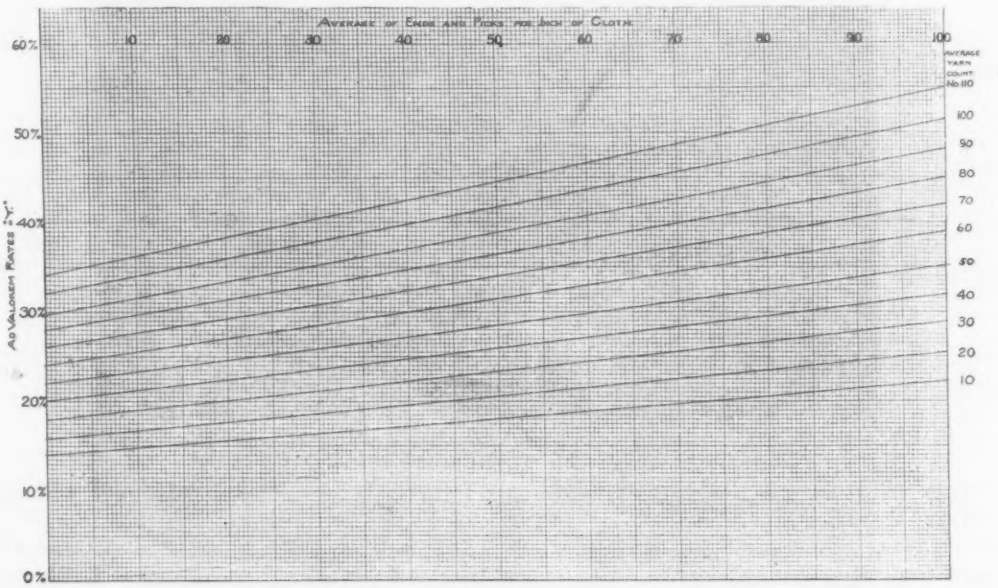
Assuming, for an example, an average of forty ends and picks as a standard, within the limits of the yarns under consideration in ordinary common grey cloth, from which to work both ways, it seems that with a basis of 15 per cent. ad valorem for No. 1 yarn, and with a coefficient taking into consideration the construction of the cloth, correct relative ordinates could be deduced, and plotted, by means of the following equation:

$y = \frac{4}{5}(0.25x + 14.75) + \frac{1}{5}(0.25x + 14.75)$ average of ends and picks per inch $\div$ 40.

y = ad valorem rate.

x = average number of the yarn in cloth under consideration.

With correct assumptions, this equation would give absolutely correct values in all cases. It is a simple equation. The result



could be plotted as shown on the chart herewith, and this process would prevent the abuses and contentions that will naturally arise under the step ladder system. There could be no complaint from the administrative department as to the use of this suggested method.

Respectfully yours,

A. H. McCarrell, C. E.

The total cost of materials in the hosiery and knit goods industry of the United States was $110,241,053 in 1909, $76,789,348 in 1904, and $51,195,868 in 1899.

The Wool Industry of Mazamet

BY ROBERT DANTZER

[Translated from the French by the Editor of the Textile World Record.]

Mazamet, with a population of 14,000, is the most important city in the arrondissement of Castres in the department of Tarn. The city is located 480 miles from Paris on the national route between Paris and Madrid. Mazamet lies at the foot of the Montagne Noire in a narrow gorge through which winds several small streams. There is at the confluence of the Tarn, the Thore, and a mountain torrent called Arnette. In this narrow valley there is also an extraordinarily savage torrent called the Arn. Water is abundant in this region and inundations are quite frequent.

A view of Mazamet

The industrial activities of Mazamet extend to a number of small places between Labruquiere and Lacatarede, among which may be named Saint Amans, Rouairoux, Pont de Larn, Lagarrigue, etc. South of Mazamet lies the village of Hautepoul, noted for its ruins, but without industrial importance. In the vicinity of Mazamet there are a number of mines, but it is the textile industry to which the locality owes its fame. Within its limits are 182 factories comprising from 50,000 to 60,000 carded woolen spindles and about 5,000 power looms. The industry gives employment to about 6,000 operatives, the products including woolen cloths, meltons and heavy flannels. The shipments of wool fabrics from Mazamet amounted to 3,200,000 pounds in 1912.

In addition to the spinning and weaving the textile industry of Mazamet includes an extensive and steadily increasing business in pulling and scouring wool for the markets of the world. The sweating process is exclusively used at Mazamet for pulling wool from the skins, which are handled with the special object of preserving the strength of the wool fiber. The pulled wool of Mazamet may be divided into two classes: 1, Washed on the skin (lavee a dos); 2, scoured after pulling (lavee a fond). Wools of the first class are simply dried after being pulled from the skins, while those of the second class are subjected to a scouring process to remove all impurities. A large proportion of the wool prepared at Mazamet is shipped to outside markets.

The skins from which the wool has been removed are called "cuirots." As soon as the wool is removed the cuirots are dried either in the open air or in drying chambers. They are then sorted according to their

form, weight and quantity, packed in bundles of a dozen each and shipped to the tanneries.

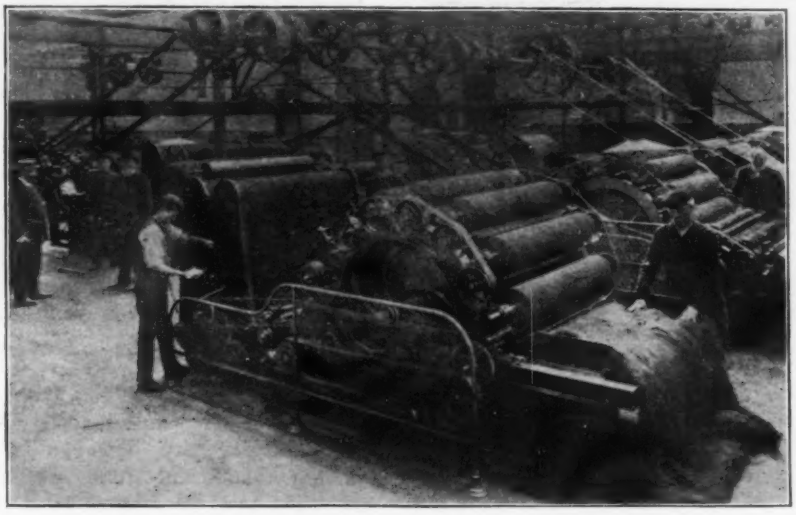
The circumstances which contributed to the establishment and development of wool scouring in the Mazamet region are:

Pulling wool in the Belle Rive pullery, Mazamet

1. The necessity for supplying the raw material to the woolen mills and tanneries that have long been in operation in this section of France.

2. The ample supply of water power at a very low cost.

3. The softness and extreme purity of the water, which contains but slight traces of lime or magnesia and which in its natural state is well adapted for washing wool.



View of the card room in the Moulin-Gau Woolen Mill at Mazamet

4. The law of 1860 which has permitted the free importation of sheep skins into France.

5. The proximity to Graulhet, the great tanning center, where from time immemorial the tanning of sheep and goat skins has been an important industry. At the present time the tanneries in this locality use more than 60 per cent. of the skins turned out by the Mazamet pulleries.

A group of Mazamet mills

At first it was the need of supplying raw material to the woolen mills which led to the establishment of the wool pulling industry at Mazamet. While the first woolen mills were established at Mazamet in 1790, it was not until 1856 that M. Perie started the first wool pullery. He established an office at La Plata for the purpose of buying the sheep skins in the Argentine Republic and which he shipped to Mazamet. His example was immediately followed by others and the industry rapidly extended under the system of free trade established by the law of 1860. The development of wool pulling in this region has surpassed the most optimistic expectations.

While the breeds of sheep have been greatly changed since the establishment of the industry, Mazamet has been utilized as an outlet for increasing quantities of sheep skins and a wide variety of wools. Not finding in La Plata a sufficient supply of skins the wool pullers of Mazamet have invaded Australia and South Africa with remarkable success. It seemed at first that the natural place for wool pulling and scouring establishments was in the Argentine Republic or near a French port, for it is easier to

View of mills in a Mazamet gorge

transport the wool and the leather than the green skins which are loaded with impurities. The difficulty, however, is that there was not a sufficient supply of labor in the Argentine or at the French ports. The wool pulleries that have started in the Argentine have not prospered further than to supply a limited local demand.

In 1912 there was 126,658,000 pounds of green skins received at Mazamet, represent-

ing 127,850 bales of 990 pounds each. These figures showed an increase of 3,000 bales above the highest previous record of 1910. The large receipts in 1912 were the result of the enormous mortality among the flocks of the La Plata. Since then Mazamet has absorbed an increasing proportion of the world's production of sheep skins.

Assuming that the stock of green skins on hand at Mazamet is 12,000 less than in December, 1911, at least 140,000 bales were treated in 1912. This work has been done in 60 mills situated in Mazamet and vicinity. Like the woolen spinning and weaving mills, the wool pulling establishments are isolated from each other and located on streams that supply the water power.

A mill and the ruins of an old chateau at Hautepoul, one-half mile from Mazamet

The receipt of sheep skins and raw wool at Mazamet for ten years are as follows:

Year	Sheep skins (lbs.)	Raw wool (lbs.)
1903	103,834,478	5,694,779
1904	76,365,258	6,615,120
1905	68,996,221	14,080,398
1906	79,263,454	5,384,027
1907	93,572,960	4,537,522
1908	92,031,436	2,360,604
1909	103,053,860	2,952,191
1910	124,202,632	6,107,039
1911	116,218,458	2,914,694
1912	126,661,011	2,559,671

While the number of sheep skins tend to increase, the receipts of wool are decreasing. The receipts were distributed among the countries as follows:

Country	Bales	lbs. per bale	Total lbs.
Buenos Aires	54,723	990	54,175,660
Montevideo	16,584	1,100	18,242,400
Melbourne	25,337	770	....
Sydney	13,426	770	37,702,251
Adelaide	10,201	770	....
Australia	10,000	660	6,600,000
Cape Spain, Africa	28,250	352	9,940,700
	158,521	5,412	126,661,011

Power Station for driving the mills of Mazamet and lighting the town

The products of the sheep skins consist of wool, skins and various by-products. The strikes at Bradford in 1911 and 1912 re-

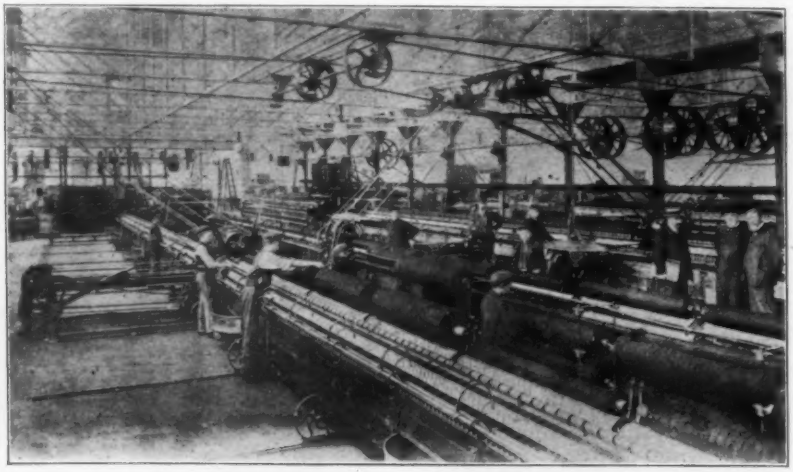
sulted in an accumulation of a large stock of wool at Mazamet. The following table shows the destination of the wool shipments from Mazamet from 1899 to 1912:

England .....bales	37,700
North of France	24,500
Germany	10,000
Russia	6,000
Other countries	22,800

The total number of pounds, 66,545,322.

obtained before tanning and used for the manufacture of glue are sold at 1 1/2 to 3 cents a pound. The scouring liquor is not treated to reclaim the wool grease as the liquor is not concentrated enough.

The business at the Mazamet conditioning house is constantly increasing. In 1912 90 per cent. of the wool shipped from Mazamet passed through this establishment, which has



The Spinning Room at the Moulin-Gau Woolen Mill at Mazamet

At the end of 1911 the stock of skins at Mazamet was very small. As a result of the low prices prevailing the demand continued active. No. 1 choice fine skins sold at $3.70 to $3.80, while No. 1 choice skins from American sold at $4.20 to $4.40. The market did not go above this level until August and then remained stationary until the end of the year at about $4.50 for fine skins and $5.40 for American skins.

The shipments of sheep skins from Mazamet in 1912 were as follows:

Graulhet .....lbs.	15,400,000
North of France	2,970,000
All other countries	6,600,000

BY-PRODUCTS

The by-products from pulled wool after washing and carbonizing amount to about 25 per cent. of the weight of the wool. The finely carbonized vegetable matter shaken out by the dusters is sold for fertilizer at about $16 per ton. The small pieces of skins

an equipment to handle 330,000 pounds of wool per day.

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The secretary of the Japanese Cotton Spinning Association has just issued some particulars of the industry for the twelve months ended June last. There were thirty-eight establishments, compared with thirty-six in 1910. The spindles numbered 2,099,764, as compared with 2,004,968 in the previous year; looms 17,202, against 15,515 in 1910. The workpeople employed were given 92,960, and the cotton consumed during the twelve months amounted to 543,592,000 pounds, against 527,651,000 pounds, in the previous year. The yarn produced is given as 445,912,000 pounds, as compared with 441,974,000 pounds in 1910. The production of cloth amounted to 226,314,000 yards, as compared with 196,728,000 yards in the previous twelve months.

THE PASSING OF THE OLD COUNTRY WOOLEN MILL

BY B. S. JOHNSON

Back from the city I looked for the old country woolen mill. The building is still standing, but its roof is tumbling in. The water runs down the raceway just as it did years ago, but the old turbine is rusty and furnishes power no more. I recall the prediction of the owner, Deacon Theodore Bird, whose mill at Bethlehem was one of the best known in Connecticut during the days when a small woolen mill was to be found in many New England towns. The good deacon's prediction that the big fish would eat up the little ones and that the small country woolen mill would become obsolete has come true. In fact he lived to see the prediction come true and with his own hands helped to remove the one set of carding machines, the old picker, the jack and the two looms. The voice that once sang gospel songs to the accompaniment of the pounding looms has long been stilled.

The old machines were far from being modern, but they were precious to the deacon who had worked hard to obtain and install them after he succeeded his father, Deacon Joshua Bird, in the ownership of the mill, the elder deacon confining his milling operations to the washing and carding of the wool for the country housewives to spin and weave.

The work was all familiar to me and the deserted old mill brings back pleasant associations. I too was fond of tending the old machines, all of them, for I was the boy and the only all-around man the deacon employed. On a recent visit to the old home town recollections of the old mill came forcibly back when I was invited to visit a new tennis court, an innovation for the village (the court and not the invitation). There was something familiar about the appearance of the roller used in keeping the court smooth. A closer inspection and I discovered that one of the deacon's cylinders from a carding machine had been made into a roller.

A RELIC OF AN OLD COUNTRY WOOLEN MILL, A LAWN ROLLER MADE FROM A CARD CYLINDER

It brought me back to the mill and the time when I sorted and weighed the wool brought in by the farmers. The deacon was honest and expected others to be, but his confidence in human nature was often misplaced, as in sorting the wool I frequently found that he had paid for stones, rags, etc., which were secreted in the fleeces. The washing of the wool was done in a small kettle of hot water and potash and in a tank of

running cold water. The old carding machines were not adapted for cotton or shoddy, even if the deacon had been disposed to have them, and the coarse cashmere and flannel, batting and yarn, were strictly all wool and of the best texture. The machines were too coarse to use the fine wool of the merino type. The spinning machine was automatic and the pride of the deacon. When it was on its good behavior I frequently tended it with the three carding machines running at the same time. Sometimes it happened the water was low and there was not sufficient power to carry all the machines.

The fulling mill was antiquated, but serviceable and substantial, and is the only part of the mill's equipment remaining intact. On Mondays it was used by the farmers for the purpose of doing the big family washings. It was popular as a laundry place, but not profitable for the deacon who charged only 25 cents each for the use of the mill and furnished fuller's soap. He had the golden rule printed above the fulling mill to remind the patrons of their obligations, but some of them failed to follow the admonition, at least in the use of the soap, and the farmers were soon obliged to furnish their own washing material. It was a popular place too for the discussing of village topics, and gossip flowed just as freely as the deacon's soap did before he nailed the barrel lid on.

Bird's mill continued its operations longer than most of the little country mills, but it was destined to go the way of the others. The old village tailor passed out of existence and the farmer commenced wearing the readymade. The deacon had a well established reputation for his goods and honest business dealings. The management of a state institution recognized this in accepting bids for the material used in making the garments worn by the inmates. The big fish were more weighty and would swallow the fish that remained small, the country mill, by underbidding, but the quality of the deacon's cloth gained the contract for the old mill owner in spite of the strong competition. Other causes finally prevailed. The one contract was only sufficient to keep the mill busy during the summer months. The boy and all-around man sought and obtained more regular employment elsewhere by means of the deacon's recommendations, a written document highly prized by the owner. It was a hard struggle for the old mill owner to give up the business which had become a part of his life. For the last time he was awarded the contract from the state institution. A pathetic appeal was written to his former helper to come back, even if only for a two weeks' vacation away from his new position, and tend the old carding machines and looms again as a diversion. The appeal was a difficult one to resist and if inclination had prevailed it would have been answered promptly. Mill hands from the larger centers were to be had, but none of them knew the ways of the country mill and Deacon Bird's last contract was never filled.

The dismantled mill is now only a landmark, but some of its golden-rule-made cloth is still in existence and doing good service to this day. The writer only a short time ago saw Lyman Sperry, a Watertown, Conn., farmer, wearing a pair of trousers made of the coarse product which was manufactured twenty years ago or more. It was recognizable to the writer at first sight.

ECONOMY OF SUPERHEATED STEAM

By S. ROSENZWEIG, Chief Engineer City Iron Works, Erie, Pa.

A paper read at the meeting of the National Association of Cotton Manufacturers

The coal bill for the power plant of a manufacturing concern represents a considerable item of the yearly expenses, and for that reason necessitates the installation of the most efficient machinery. Of all means to improve the efficiency of a plant, the application of high steam pressures and high superheats have proved to be of greatest value, due to the fact that the considerable advantages derived from it may be obtained at a very small expense.

The greater the steam pressure in a steam engine, the greater is its capacity to develop power. By increasing the steam pressure from one hundred to two hundred pounds, we can double the output of the engine or do the same work as before with a considerably smaller amount of steam. Steam at 200 pounds pressure contains but 11 B. t. u. per pound more than steam at 100 pounds; so if the coal has 14,000 B. t. u. per pound, and with a boiler efficiency of 70 per cent., only 1/9 part of 1 pound of coal is necessary to raise the steam pressure from 100 to 200 pounds. In a plant that consumes 50,000 pounds of coal per day, only

55 pounds are required for this purpose, a quantity which of course is negligible.

It follows that it is highly economical to use high steam pressures. A limit is reached for stationary plants at about 250 pounds gauge pressure on account of the types of boilers now existing.

By the use of superheated steam, the efficiency of the plant can be still further increased. When steam leaves an ordinary boiler it mostly contains already a few per cent. of moisture, and a further reduction of heat which naturally takes place in the pipes and on entering the cylinder of a steam engine, will result in further condensation. This condensed steam is detrimental for several reasons.

Water entering into the pipes endangers the whole plant due to the possibility of water hammer. Even with the installation of traps to drain the water from pipes, the danger of water hammer is ever present and has lead to complicated pipe arrangements to give the plant a greater flexibility in case of a breakdown.

By means of properly installed superheaters, it is possible to eliminate entirely the danger from water hammer and so increase considerably the safety of the plant. If the steam is sufficiently superheated, condensation in the pipes will be avoided and also the pipe losses minimized because superheated steam is a poor heat conductor and allows of considerably higher steam velocities which of course results in smaller pipe diameter.

In the study of the steam engine it was found that the water contained in the steam affected seriously the economy of the engine as it will when carried into the cylinder increase the initial condensation, thus wasting a greater part of the incoming steam. Careful experiments have shown that 35 per cent. and more of the steam is lost through condensation in the cylinder.

This condensed steam in the shape of water is of course lost for the purpose it was generated, as only the expansive force of steam can be utilized in an engine cylinder. It is by no means excessive to assume that when working with saturated steam 40 per cent. of it is condensed into water after reaching the cylinder. It follows that a great amount of steam was generated in the boiler to no advantage or purpose. It has been amply demonstrated that by the use of superheated steam this initial condensation can be considerably reduced or even entirely eliminated.

The value of superheated steam lies in the fact that it has to give up first its superheat before condensation can possibly take place, and that being a poor heat conductor it retains its heat better and longer than dry saturated steam. As this property becomes more marked, the higher the superheat is, it is well advisable to use high degrees of superheat in order to obtain highest economy. The author from his own experience has found that a superheat of from 200° to 250° Fahrenheit was quite commercial and gave very satisfactory working results.

The higher initial cost for installing superheaters in a power plant was easily counterbalanced by the following items:

First. Reduction of heating surface in the boilers or in existing plants increased output of the plant without additional installation of boilers.

Second. Smaller piping as superheated steam allows of higher steam velocities and simpler piping arrangement on account of the absence of water in the pipes.

Third. Higher thermal efficiency of the steam engine and consequently reduced coal consumption, which in turn simplifies the handling of the coal and ash apparatus and other auxiliary machinery in the power plant.

To give a few examples, I may mention the power plant of the electric station in Vienna, Austria and Rome, Italy. The former had twenty piston valve engines of 1,000 horse power each. When the superheaters were installed the high pressure cylinders had to be reconstructed and were fitted with Lentz valves and gear. The outlay of about $80,000 was recovered within two years from the saving in coal, while in the power station at Rome, the installation of Lentz engines and superheaters increased the output of the plant by about 30 per cent.

The introduction of superheat further simplified greatly the design of steam engines, inasmuch as compound engines with superheated steam successfully replaced triple and quadruple expansion engines, thus producing a great saving in initial cost, floor space, and running expenses.

Furthermore, simple non-condensing engines working with superheated steam gave economies that equal those of ordinary compound condensing engines, and compare very favorably with those of the very best types of Corliss engines made in the United States but working with saturated stream.

F. W. Dean, Consulting Engineer of Boston, was in charge of a test that was recently run at the plant of the Erie City Iron Works on a simple non-condensing Lentz engine of 250 indicated horse power that gave with 133 pounds gauge pressure and only 93° superheat a steam consumption of 16.3 pounds, demonstrating that it is possible to produce a horse power hour in simple non-condensing engines on two pounds of coal, while in compound condensing engines with high grade coal, this figure in some instances was reduced to one pound of coal per horse power hour. I may refer here to a test that was carried out on a 3,000 horse power Lentz engine installed at the electric station of the city of Charlottenburg near Berlin, Germany, where with 192 pounds gauge pressure and 270° superheat an economy of 8.8 pounds per indicated horse power per hour was obtained.

It is frequently assumed that superheat does not improve the efficiency of the whole plant as the gain obtained in a steam engine is counter balanced by the great amount of coal burned in the grades of the boiler to produce the superheat. This view is erroneous though of course the coal economy is not quite as good as the steam economy.

The following interesting table compiled from a number of tests made by a German authority shows the increased steam and coal economy when the superheater was placed in the boiler:

	% Steam	% Coal
Simple non-condensing engine	21	16
Compound condensing engine	16	10
Triple expansion condensing engine	10.5	6.5

The gain in the pipe line between the boiler and the engine has not been considered.

The value of superheated steam was fully recognized more than half a century ago, but on account of the difficulties experienced with faulty superheater and engine constructions, superheated steam found but slowly its way into power plants. Wilhelm Schmidt, the well known German engineer, deserves the credit of having been the first one to design and build engines and superheaters adapted for high superheats. In the nineties of the last century he brought engines on the market which operated safely with 250° of superheat.

German engineers mostly followed the design of Schmidt for superheaters, by using plain seamless drawn steel tubes, expanded into steel headers which were so placed into the boiler that the header and its connections were not within the range of the hot gases. In America the Foster superheater has found considerable use in the last five years. This superheater consists of straight seamless drawn steel tubes, on the outside of which are fitted a series of cast iron rings to protect the steel tubes from the hot gases.

Both these types and many others which are on the market today have given perfect satisfaction and show that the mechanical troubles experienced with superheaters twenty and thirty years ago have been fully overcome.

The application of superheat was also restricted on account of the bad effect, the high temperatures had on valves unsuitable for superheat, but these obstacles were never sufficient to blind engineers as to the merits of superheated steam. It was found that all sliding valves, as flat, piston and Corliss valves, were not suitable for high temperatures, as they have to depend upon their surrounding walls for steam tightness and required careful fitting for varying temperatures and abundant lubrication.

German engineers have, for that reason, devoted their efforts for the last fifty years to the perfection of the balanced and frictionless poppet valve, and have fitted all their engines with this device. On account of the great success obtained with poppet valve engines, this type entirely replaced the Corliss engine in Germany, Austria, and Switzerland, during the last thirty years.

The advantages of the poppet valve are: no rubbing surfaces, hence no lubrication, and its adaptability for high temperature; small weight and practical balance, hence its adaptability for high speed and high steam pressure; no possible wear, consequently the economy maintained for an indefinite period.

There are a number of excellent types of poppet valve engines, built on the European continent and in England. Of these, the Lentz engine has figured most prominently as the best representative of its class. As the Lentz engine is to my knowledge the only modern poppet valve engine built in this country, a short description of its constructional features will no doubt be of interest.

It is said that the Egyptians put a shuttle in the hands of their goddess Isis to signify she was the inventress of weaving.

SOUTHERN NEW ENGLAND TEXTILE CLUB

Over one hundred members and guests attended the May meeting of the Southern New England Textile Club which was held at the Narragansett Hotel, Providence. The principal topic of discussion was the tariff question. F. G. R. Gordon made an address on the "Tariff, Socialism and Syndicalism." On motion of John Burton, agent of the Nashawena Mills, New Bedford, a committee was appointed to draw up resolutions of protest against the Underwood bill. These resolutions, which were adopted unanimously, were as follows:

Resolved, That the Southern New England Textile Club, in monthly meeting, representing through its 330 members, approximating 200 textile plants and allied industries, after a most extreme and careful consideration of the rates and duties imposed upon cotton yarns, cotton cloths and cotton manufactures, contained in House Report 3321, better known as the Underwood Bill, now before the United States Senate, believing that the great textile industries which it represents, meaning alike those who are indirectly interested in whatever capacity, as well as the wage earners, who are supported directly from those industries, consider it their bounden duty to emphatically protest at the same becoming a law for the reason that they would be seriously and disastrously affected.

While we do not impugn the good intentions of anyone, yet on the other hand, we must deprecate the judgment of those who believe and teach that history will not under like conditions repeat itself.

The effect of material tariff reductions upon the business of the country is no experiment, and for this reason we would respectfully request that the reduction of duties be so modified that the present industries can at least continue without a readjustment of mill values and reduction in wages.

Resolved, That a copy of these resolutions be sent to the President, the Chairman of the Commitee on Ways and Means of the House of Representatives, the Chairman of the Committee on Finance of the Senate, and to all individual Senators and Representatives in Congress.

So great was the interest shown in the tariff question that the formal adjournment did not interrupt the discussion, Mr. Burton continuing it with a very earnest address showing the need for protection against foreign competition. He was followed by a number of other members.

The value of the silk manufactures of the United States for 1909 was $196,475,000, capital invested was $144,799,000, and the number of employes was 104,261.

THE WOOLEN AND WORSTED OVERSEERS' MEETING

The thirty-first semi-annual meeting of the National Association of Wool and Worsted Overseers was held at Rocky Point, R. I., Saturday, May 17, about three hundred members being present. The meeting was called to order shortly after 11 a. m. with the reading of the minutes of the last meeting, the same being unanimously accepted.

Next in order was the presentation of new applications for membership. The names were placed in the hands of the committee to act upon at the next meeting.

The candidates for the November election were then brought up, and are as follows:

For vice-president, Richard J. Hill, Woonsocket, R. I.

For first vice-president, Edgar N. Taft, Bridgston, R. I.

For second vice-president, James H. Cobb, Careyville, Mass.

For third vice-president, James Wilson, Providence, and Joseph H. Driscoll, Manton, R. I.

For secretary, Walter Pickford, Clinton, Mass.

For treasurer, Thomas Buchan, Hyde Park, Mass.

For secretary of the beneficiary department, Henry G. Morey, Danielson, Conn.

For treasurer of the beneficiary department, Thomas Buchan, Hyde Park, Mass.

Trustees: Charles M. Hurst, Providence, R. I.; Louis Carmark, Providence, R. I.; Wm. E. Davison, Putnam, Conn.

A committee of five was then appointed to present to Congress resolutions in opposition to the Underwood tariff bill, the motion being made by T. W. Biddles, who was afterwards appointed chairman of the committee with W. E. Davison, Richard J. Hill, P. F. Gallagher and Edgar N. Taft.

The contract to publish and furnish the Association the manual was awarded to Frazier O'Leary, of Boston, Mass., at the rate of $400 per year.

It was suggested that the Association hold their annual and semi-annual meetings on the third Saturday of January and July each year instead of May and November. The motion for the adoption of the Australian form of ballot, which was much talked of at the last meeting, was accepted and will go into effect at the next meeting.

It was suggested that the association appropriate $25 to be divided into prizes for the best papers read at the November meeting. A committee of five was appointed by the president as judges.

The following is a list of the members present:

CONNECTICUT

Ashton, Fred, Putnam.
Adams, Forrest V., Staffordville.
Aback, Edward H., Stafford Springs.
Burns, John J., Moosup.
Creighton, F. R., Quinebaug.
Dempsey, Edward F., Quinebaug.
Davison, Wm. E., Putnam.
Eyers, William, Centre Village.
Fetherston, Bernard, Plainville.
Gormley, John H., Stafford Springs.
Greendonner, Geo. J., Stafford Springs.
Henault, Charles J., Norwich.
Hollingsworth, Fred, Norwich.
Kennedy, John, Mystic.
Lenahan, John J., Putnam.
Lyons, John J., Moosup.
Meyers, Fred W., New Boston.
Mcrey, H. G., Danielson.
Nettleton, Wm. H., Central Village.
Neff, Fred C., Rockville.
Prenhal, John, Central Village.
Quinn, John J., Stafford Springs.

MASSACHUSETTS

Ainley, Emmett, Clinton.
Army, Jos. E., Millbury.
Archer, Andrew, Franklin.
Allison, Louis M., Worcester.
Ahern, William, Worcester.
Biddles, Thomas W., Holyoke.
Barrett, J. J., South Hadley Falls.
Brown, F. A., Monson.
Baxter, George, Caryville.
Bullard, J. W., Rochdale.
O'Brien, William J., Lawrence.
Byron, Thomas, Franklin.
Bailey, R. E., Foxboro.
Brownell, M. C., Worcester.
Babcock, F. L., Boston.
Bagley, William, Millbury.
Buchan, Donald, North Andover.
Biddles, G. N., Smiths.
Chamberlin, W. E., Franklin.
Cobb, James H., Caryville.
Carter, James A., Uxbridge.
Carmichael, A. F., Lawrence.
Clavin, James, Webster.
Daw, Harry H., Farnumsville.
Durken, John T., Maynard.
Daly, Jos. T., Holliston.
Eddy, E. S., Worcester.
Ellis, Herbert, Franklin.
Emsley, Howard A., Farnumsville.
Fraser, George, New Bedford.
Francis, Charles A., Lowell.
Gaulette, Thomas, Caryville.
Gove, Clarence S., Uxbridge.
Graham, John E., Boston.
Garth, Asa, Fitchburg.
Greenback, G., Uxbridge.
Gwynne, Robert A., Fitchburg.
Heaton, John, Monson.
Hamilton, George L., N. Andover.
Howarth, George E., Caryville.
Heaton, John A., Webster
Hawkes, Charles W., Boston.
Hillen, James H., Lowell.
Jowett, Thomas P., Southbridge.
James, E. H., Lawrence.
Jowett, William, Southbridge.
Kennedy, Charles A., Pittsfield.
Kisro, Emil A., N. Billerica.
Keough, E. W., Middleboro.
Kenny, Simon P., N. Andover.
Lang, Robert J., Farnumsville.
Lapraik, David A., South Hadley Falls.
Lord, James T., Blackstone.
Lyons, Thomas, Pittsfield.
Loomis, William T., E. Douglas.
Linnehan, John W., Boston.
Lambert, Nelson C., Webster.
La Rose, J. N., Cherry Valley.
Midgley, Herbert, Worcester.
Magner, J. M., Medford.
Morgan, James J., Maynard.
McConachie, William R., Clinton.
McGlone, Edward F., Uxbridge.
McGuire, J. E., Monson.
Marley, John C., Lawrence.
Manock, Frank, Lawrence.
McClintock, Harry, Uxbridge.
Mowry, H. S., Lawrence.
McCarthy, F. L., Fitchburg.
McKinnon, William, Farnumsville.
Mack, James, Quinebaug.
Neff, Augustus C., Millbury.
Oldfield, Ben, Methuen.
Ogden, John, Lowell.
Owens, Richard J., Fitchburg.
Parent, Theodore, N. Adams.
Philbrick, Charles H., Worcester.
Roberts, M. H., Pittsfield.
Ridings, J. H., Lawrence.
Rae, James J., Worcester.
Riley, P. E., Uxbridge.
Schoon, Albert G., Lowell.
Shaw, Henry, Leominster.
Slater, Anthony, N. Andover.
Smith, T. P., Worcester.
St. George, F. L., West Medway.
Smith, F. H., Boston.
Shea, M. H., Dalton.
Truesdale, J. E., Jefferson.
Whitehead, J. W., Lowell.
Whalen, K. J., Huntington.
Winslow, John H., Jefferson.
Wisnart, George, New Bedford.
Whittemore, F. L., Quinepoxet.

MAINE

O'Donnell, R. A., Bridgton.
Patterson, Francis E., Bridgton.

NEW YORK

Thomas, John A., Mechanicsville.
Templeton, H. C., Stottville.

NEW JERSEY

Ayres, John F., Raritan.
Ashler, Jacob, Bound Brook.
Clark, Fred T., Somerville.
Gunther, Fred, Somerville.
Gillan, Daniel, Passaic.
Moore, E. F., Bound Brook.
Philbrick, W. H., Way.
Triste, J. F., Somerville.

PENNSYLVANIA

Bolger, John F., Philadelphia.
Clemence, G. B., Philadelphia.

NEW HAMPSHIRE

Hirst, James, Peterboro.
Igo, Thomas H., E. Rochester.
Nash, Fred W., Keene.

RHODE ISLAND

Allen, F. W., Pascoag.
Atteridge, Charles, Providence.
Ainley, Albert, Mapleville.
Altridge, Charles H., Providence.
Bressett, A. J., Providence.
Bradley, J. E., Talcottville.
Brooks, H. D., Providence.
Bottonley, George H., Smithfield.
Burnes, J. C., Providence.
Bedford, Ephraim, Thornton.
Coe, D. E., Providence.
Ccopwell, Thomas F., Providence.
Carmark, James C., Woonsocket.
Camero, Robert, Peace Dale.
Calnan, James J., Pascoag.
Carter, Fred, Pascoag.
Chase, Ralph E., Washington.
Cantlin, John J., Providence.
Cantlin, John C., Providence.
Clarkson, Frank W., Glendale.
Carmark, Louis, Providence.
Coleman, George H., Pascoag.
Doyle, Patrick F., Pascoag.
Devine, W. E., Providence.
Driscoll, Joseph H., Manton.
Dicks, L. H., Woonsocket.
Dussault, Richard J., Providence.
Durkan, F. J., Greenville.
Dawson, Robert W., Harrisville.
Deady, Eugene, Providence.
Dolan, Joseph T., Providence.
Deverall, E. F., Providence.
Dregham, A., Woonsocket.
Davis, Arthur E., Peace Dale.
Egan, George F., Woonsocket.
Fox, Edmund, Providence.
Fitzpatrick, John F., Woonsocket.
Fanning, Wm. J., Providence.
Fraser, T. H., Glendale.
Guerin, John, Woonsocket.
Gill, Albert, Providence.
Grunby, C., Providence.
Geer, C. O., N. Scituate.
Gledhill, Walter, Providence.
Greaves, Edward, Olneyville.
Guerin, Julien J., Woonsocket.
Gordon, Thomas, Providence.
Gillon, Alphonse, Woonsocket.
Hopkins, Henry, Providence.
Hamm, Lyman, Potter Hill.
Hefferman, J. L., Greenville.
Hill, Richard J., Woonsocket.
Hetherman, John, Oakland.
Hodgman, Harry H., Harrisonville
Henderson, John, Providence.
Jennings, E. J., Centreville.
Jones, John L., Centreville.
Jones, Ernest, Davisville.
Jennings, C. R., Woonsocket.
Kershaw, Squire, Providence.
Keegan, C. I., Pascoag.
Kavanaugh, George, Providence.
Knox, James, Woonsocket.
Logan, Fred E., Pascoag.
Lancaster, J. E., Pawtucket.
Leach, James E., Lafayette.
Lacy, E. M., Pascoag.
Morley, Leonard S., Thornton.
McCauley, F. J., Woonsocket.
McGeough, John T., Woonsocket.
McClure, Thomas R., Woonsocket.
Metcalf, H., Providence.
Malone, Patrick, Bridgton.
McDonald, James, Providence.
Moore, John F., Centreville.
Mellon, Lafayette.
Neild, Samuel J., Providence.
Nelligan, M.
North, Charles, Providence.
O'Toole, William, Woonsocket.
Perkins, F. W., Woonsocket.
Pashles, William, Ashaway.
Parkin, Thomas, Providence.
Pero, Orville, Woonsocket.
Powers, E. P., E. Greenwich.
Parkin, James, Providence.
Purcell, Patrick, Johnson.
Pickford, J. H., Carolina.
Prendeau, Medric, Woonsocket
Quinn, J. E., Providence.
Quinn, Michael F., Pascoag.
Ryan, Thomas J., Pascoag.
Rowe, Thomas, Woonsocket.
Rigney, W., Lafayette.
Ringland, R. W., Oakland.
Ringland, H. S., Providence.
Rieley, Thomas F., Pascoag.
Schofield, William, Providence.
Sutcliff, E. A., Providence.
Stewart, Henry L., Wickford.
Sandford, W. H., Woonsocket.
Smith, Edward B., Harrisville.
Spencer, Moses, Woonsocket.
Southwell, James, Providence.
Schortmann, R. C., Providence.
Thompson, Hubert, Providence.
Thomas, Richard, Thornton.
Taft, Edgar M., Bridgton.
Thompson, Charles, Tarkhill.
Thompson, Andrew S., Tarkhill.
Tetley, Edward D., Washington.
Troy, James A., Washington.
Templeton, George E., Harrisville.
Waterhouse, William, Providence.
Ward, Irving, Providence.
Wilson, James, Providence.
Wassner, Frank, Providence.
Webster, David H., Providence.
Wood, Joseph, Providence.
Wolf, William A., Providence.
William, Fred, Rockville.
Riley, Albert E., Rockville.
Richmond, Thomas, Putnam.
Shepherd, A. B., Stafford Springs.
Thorp, W. E., Norwich.
Thorp, Fred, Tacotville.
Weidermann, H., Central Village.

PROTEST AGAINST LABOR LEGISLATION

Nearly three thousand manufacturers of the state of Pennsylvania went in a body to the Capitol at Harrisburg on May 13 to protest against the bills regulating the employment of women and children and providing for a minimum wage. These measures had passed the House of Representatives and were before the Senate Committee on Judiciary. The protest began with a statement to the committee by T. R. Adams, of the Joseph M. Adams Co., worsted spinners of Manayunk. The points he made against the bill were summed up as follows:

First—They provide for different hours of employment for different employes engaged in identical processes in the same establishment.

Second—They provide for a shorter work week and shorter work day than is provided by law in the chief competing states and countries.

Third—They throw such formalities and difficulties around the issuance of certificates to minors between 14 and 16 years of age as to make the employment of such minors difficult and perilous to the employer.

Fourth—They allow prosecution to be instituted against an employer by any discharged or disgruntled person or by an agitator or demagogue.

Mr. Adams outlined conditions of employment which the manufacturers believed should receive the approval of the legislature. These included a form of employment certificate; sanitary conditions in factories; elimination of all night work, and improved factory inspection. The manufacturers asked that the bills be amended to include the following provisions:

First—A uniform work period should be provided for all classes of labor and this period should be 55 hours per week and 10 hours per day with Saturday half holiday.

Second—Provision for issuance of school certificates should be left as in the present law except that in the case of a minor being discharged or quitting work the certificate should be returned directly to the school authority instead of being handed to the minor.

Third—The excessive scholastic requirements, particularly applicable to foreign-born children, should be reduced to a more reasonable point.

Fourth—The right to bring private prosecution for alleged violation of the law should be eliminated and the right to prosecute should be left as it is at present with the State official charged with the duty of enforcing the law.

C. F. Williams, president of James Lees & Sons Co., worsted spinners of Bridge-

port, Pa., followed Mr. Adams. John P. Wood, of Philadelphia, made a statement in behalf of the Cloth Manufacturers and Worsted Spinners' Association. He presented statistics in opposition to the claim that occupation in the textile industry has a tendency to develop tuberculosis and advocated the appointment of a commission to investigate industrial conditions throughout the nation to work with similar commissions from other States. Mrs. Louis Jurist, a member of the Philadelphia Civic Club and manager of the House of Detention, made an argument in opposition to the bills.

FORTY YEARS AGO

Taken from the files of the Industrial Record, now the Textile World Record.

We have in our library the complete files of the Textile World Record, formerly the Industrial Record, from 1868 down to the present time.

The Industrial Record was the first textile journal published in the world, to our knowledge; certainly it is the only one which has preserved a continuous history for forty-five years.

It has been interesting to us, and we think it will be to many of our readers, to look over those files to the time when the textile industry in America was beginning to expand.

It has been suggested that we reprint some extracts from those old files from time to time. The following items are taken from the issue of 1869 to 1876.

September 1, 1869. The Pacific Mills, Lawrence, Mass., have 100,000 cotton spindles and 16,000 worsted spindles, and operate 3,500 looms with 18 printing machines. Thirty-six hundred operatives are employed.

September 1, 1869. The National Cotton Manufacturers' and Planters' Association was formed at a meeting in New York on June 30. Amos A. Lawrence of Massachusetts was elected president. Among the vice-presidents were W. P. Haines, Maine; E. A. Straw, New Hampshire; E. R. Mudge, Massachusetts, and Henry Lippitt, Rhode Island. The cotton growing states were also represented among the officers.

September 8, 1869. Opening of the joint exposition of the wool industry by the National Association of Wool Manufacturers and the National Wool Growers' Association at the American Institute, New York. Among the manufacturers exhibiting their products are The United States Bunting Co., Lippitt Woolen Co., Pacific Mills, Washington Mills, Wm. Duncan & Sons, Franklin, N. J.; Salisbury Mills, Riverside Mills, Star Mills, New England Co., Rock Co., Hockanum Co., Atlantic Delaine Co., Arlington Mills, Wanskuck Mills, Hartford Carpet Co.

October, 1869. Dobson, Davis & Co. start the Pioneer Woolen Mill at Pittsfield, Mass., with a daily consumption of 300 pounds of wool and a production of 400 yards of Scotch goods.

October, 1869. The Bureau of Agriculture in a report covering not more than one-quarter of the country, states that 130,427 sheep were killed by dogs in 1866.

October 5, 1869. E. B. Bigelow, president of the National Association of Wool Manufacturers, at an address at the wool exposition states that the American wool clip in 1868 amounts to 177,000,000 pounds as compared with 52,500,000 pounds in 1850.

November 1, 1869. Bengal indigo quoted at $2.75 to $3.40 per pound. XX Ohio wool, 50 to 52 1/2 cents a pound, and Middling Uplands cotton at 26 5/8 cents a pound.

December, 1869. The Bates Mfg. Co., Lewiston, Me., are operating 40,000 cotton spindles and 10 sets of woolen cards, making cotton goods and fine woolen beavers.

November 21, 1869. The Boylston Bank, Boston, was robbed of about $400,000 in United States bonds and railroad stocks.

December 1, 1869. Charles L. Harding, 38 Franklin St., Boston, has made arrangements to purchase the Merchants Woolen Mills at Dedham, Mass.

Burbanks Hotel, at Pittsfield, six stories high, was blown down on Saturday morning by a tremendous gale.

January 1, 1870. The Ramie Producing and Supply Co. make plans to raise ramie fiber on 200 acres of land in Louisiana.

March, 1870. One-third of the woolen machinery in the country was idle during December and January.

March, 1870. The Hamilton Woolen Co. has turned out some fine printed delaines. The Atlantic Delaine Co. have heretofore been the only producer of these goods.

April 1, 1870. A petition signed by 33 corporations and 12 individuals manufacturing woolen goods is presented to Congress protesting against the high tariff rates on wool used by woolen manufacturers, as compared with the low rates on wool used by carpet and blanket manufacturers, and asking that the wool tariff be equalized. Among the signers were Edward Harris, Slater Woolen Co., Lippitt Woolen Co., Wanskuck Co. and the Ray Woolen Co.

May 1, 1870. The New England Cotton Manufacturers meet and elect E. A. Storer, president; A. D. Lockwood and W. A. Burke, vice-presidents. The directors are John Kilbourn, Charles Nourse, A. G. Cumnock, Thos. S. Borden and P. Adams.

June 1, 1870. The Conshohocken Mills have installed "Brothers" self-operating jacks and are producing woolen yarn of high grade. The mills employ 225 hands and turn out 5,000 yards per week. George Bullock is manager.

Correspondence and Notes

UPON TEXTILE TOPICS AT HOME AND ABROAD

THE MANUFACTURE OF ELASTIC FABRICS

By SAMUEL BROWN

(Continued from April.)

In the making of rubber warps, such as are used for elastic fabrics, there enter factors which are peculiarly different from the warping of other materials, like silk, cotton, wool or worsted. In rubber threads we have to contend with a material in which the slightest irregularity of tension on the individual threads will produce the same relative irregularity in the warp, and a corresponding irregularity in the fabric when it is woven. As I have already described in a former article dealing with the manufacture of rubber thread, these threads are cut from a sheet of rubber cloth, and are all of one uniform length when not subjected to any tension or "stretched," and it is absolutely essential that the same relative uniformity of length and freedom from irregular tension be maintained throughout all the preparatory processes before going to the loom, otherwise it will be impossible to get perfect goods.

In making rubber warps for narrow fabrics, where only a limited number of threads are required, it is customary to work from an entire sheet of rubber, taking away from it the necessary sections or strips containing the required number of threads. This separation may be done in two different ways. The first method, which is the one most generally used where sufficient floor space is available, is first to unchain the long sheet of rubber to its full length from head to tail. This requires a room about 200 feet long. The "head" of the sheet is then spread out flat on a series of hooks at the beaming machine, Fig. 5, and the tail end of the sheet is fastened securely, so as to hold it in a fixed place at the other end of the room, the warp being put under a fair tension. For narrow fabrics, such as garters and suspenders, several warps are usually beamed at the same time.

The required number of threads for one warp are counted from the edge of the sheet, A, Fig. 1, and broken off. This section, or warp, taken from the sheet, is noosed to a tail string, B, Fig. 4, which is fastened to the barrel on the beam, C, and the noosed part is snugly laid in a countersink, D, so that there will be no irregularity or lump on the beam barrel to interfere with the lay of the threads. Each separate thread in the warp is then spaced in the reed, E, so that they will just cover the width of the inside of the beam flanges. This is repeated with all several sections, which are to be warped at the same time. One reed is employed, which is long enough to cover the several beams. This reed is so arranged that it may be moved sideways across the face of the beams, that each warp may be properly centered, thus the warp be kept level. When the reeding is done, all the required warps are carefully separated from head to tail, and cut away from the remainder of the sheet at the tail end. The operator then starts the beaming machine, which may be operated either by hand or power, and the warps are then wound up. At the same time the helper walks down towards the machine, carrying the tail end and keeping the warps under a tension as near uniform as possible. When the warps are all wound on the several beams, a leash is taken as in ordinary cotton warps, and each separate section is knotted and fastened so that it will not unwind.

The previously described method of making narrow warps is varied somewhat where floor space is limited. A horizontal reel, Fig. 6 and 7, is sometimes used to roll the sheet on as it leaves the chain, instead of stretching it out to its full length. This reel is usually about 4 ft., 6 in. high and 6 ft. wide. The head of the sheet is split into the required sections of warps. Each sec-

tion is fastened to a separate hook, A, across the face of the reel. The sheet is then rolled on the reel, each separate section of the sheet passing through a dent in a coarse reed, B, for the purpose of spacing, until the tail of the sheet is reached and the sections separated. The sections are then beamed separately or in groups. A strap brake, C, with weights attached is adjusted on the face of the reel to keep the rubber at the required tension when it is passing from the reel to the beam.

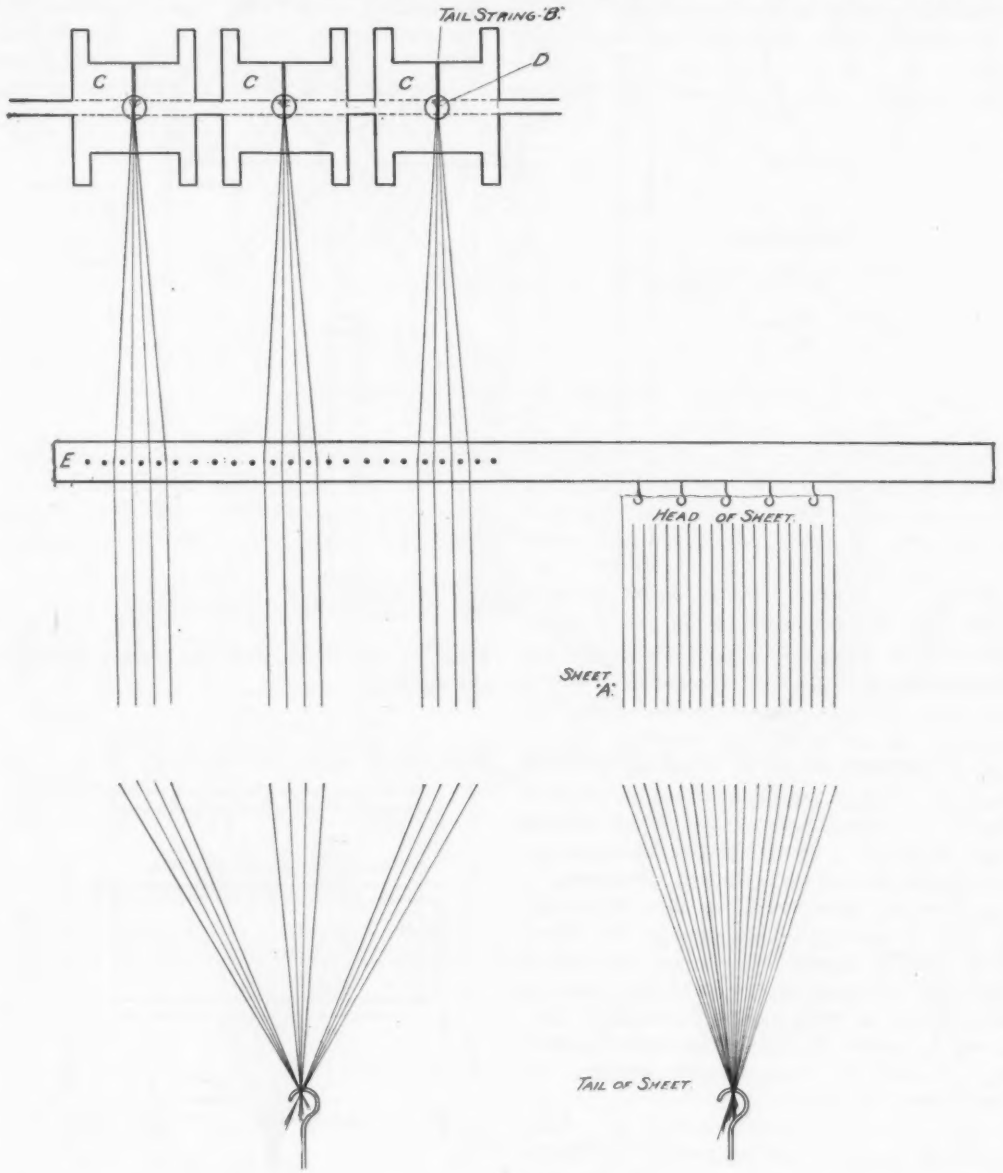

FIG. 5

In making warps for wide fabrics, such as shoe gorings, the entire process is mechanical. Each separate warp is specially ordered from the thread manufacturer, and is delivered in chain form containing the requisite number of threads, possibly 100 or more. A sketch of the machine used is shown at Fig. 8. It is mounted on an iron frame, A, which carries the power driven warp beam, B. Behind this is an open top expansion reed, C, the dents of which can be regulated to open coarse or fine, as shown in Figs. 9 and 10. This reed is also fixed with a screw sideway adjustment for centering. Behind this reed are fixed two pairs of nip rolls is an open roller, F, which is followed by a belt driven beater roll, G, used to beat out the warp threads straight, as they leave the chain.

The rubber warp is first laid upon a cloth on the floor, under the beater roll, G, and is then loaded with soapstone or talc to give free and smooth working. The head of the sheet is then passed over the beater roll, G, and the open roll, F, through the two pairs of nip rolls, E and D, over the expension reed, C, and looped to a leader on the beam as previously described. Each separate thread is taken in regular order from the head of the sheet, and put into a dent of the reed, C.

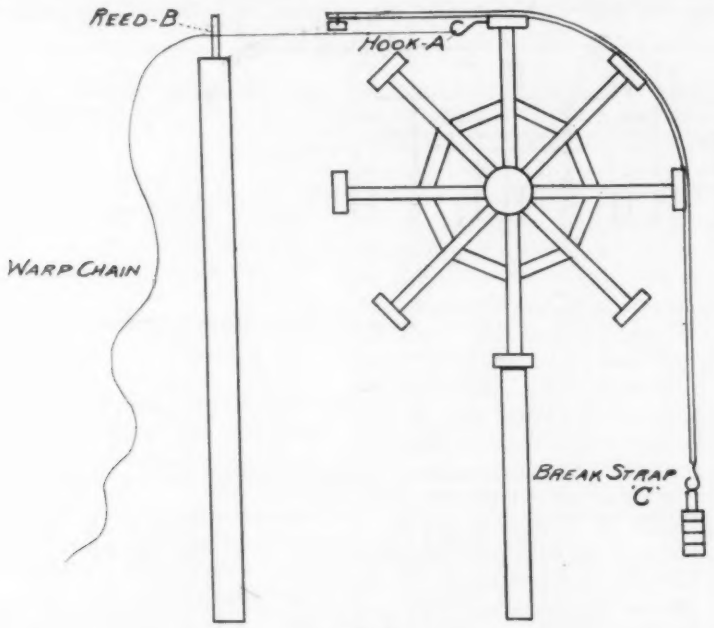

FIG. 6

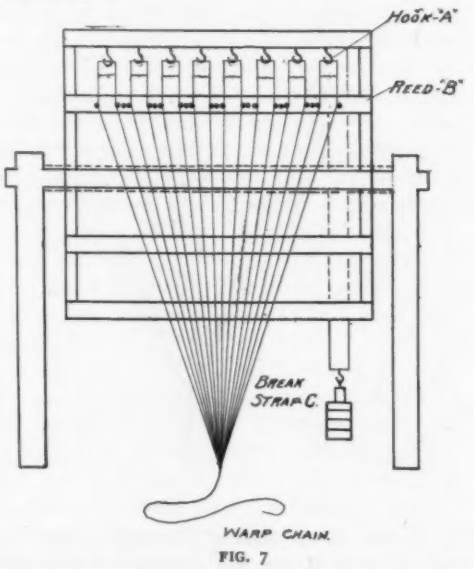

FIG. 7

During this process the two pairs of nip rolls, E and D, which have a weighted lever

adjustment, are left open. The section of the warp now lying between the two pairs of nip rolls is brought down in loop form, H, and the nip rolls are then closed with the warp left in this position. These nip rolls are speeded alike and the rubber is always

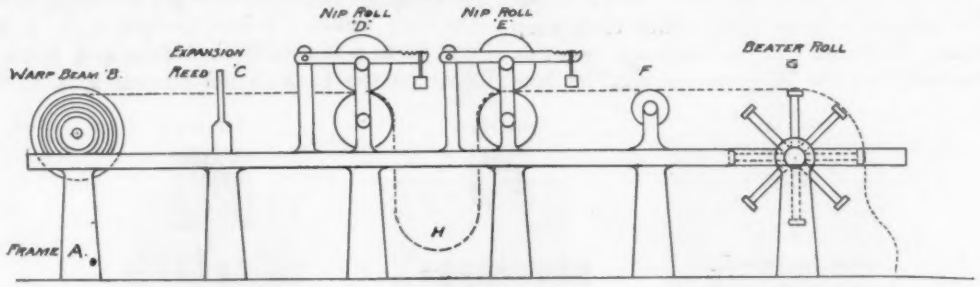

FIG. 8

kept slack between the two gripping points, so that all threads passing through the last set of nip rolls, D, are perfectly gauged in length and tension when passing through

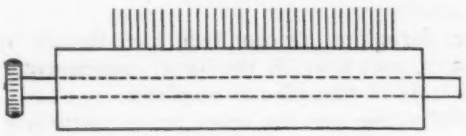

FIG. 9

the reed, C, and on to the beam, B, between which points the threads of rubber are under considerable tension, inasmuch as

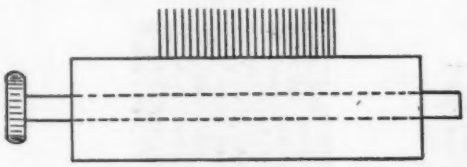

FIG. 10

the beam, B, is driven faster than the nip rolls, D and C.

In beaming the warps, great care must

FIG. 11

be taken to avoid any irregularity in the lay of the threads, as any ridges, being of larger circumference than other parts, will come off slacker when weaving and the remaining part of the thread will be correspondingly tighter. In weaving, these tight threads will chafe and break. Both the slack and tight threads will spoil the goods. Should any breakage of threads occur while warping, the broken threads can be tied fast only by a square knot, Fig. 11. All other knots will draw apart when the thread is tightened in the process of weaving. Should any considerable time elapse before putting the warps in the looms, they must be stored in a dark, cool place, as the threads when under tension soon deteriorate if exposed to light and heat.

MARKETING WOOL IN GERMANY

It is reported from Berlin that the organizations of German sheep farmers are discussing with certain firms of wool dealers proposals for making Berlin the center of the German wool trade. From time immemorial annual wool fairs have been held in many country towns. These towns have become less important during the last decade, and wool auctions are now being held several times yearly at Berlin, Breslau, Forst and Gustrow (in Mecklenburg). Paderborn has its auctions for Westphalian wool, while wool from the German colonies is sold by auction at Bremen. It is argued that such decentralization is in the interests of neither the farmer, the dealer, nor consumer, and it is proposed that all wools should be sold by auction in Berlin, under the management of a leading Berlin firm of wool dealers closely connected with the Deutsche Bank.—The Manchester (Eng.) Guardian.

A HAND BOOK OF WEAVES

By G. H. OELSNER, Director of the Weaving School at Werdau.

Translated and Revised by Samuel S. Dale

This Series began in July, 1911

WEAVES WITH WARP THREADS ALTERNATING ON FACE AND BACK

A texture is made firmer when each warp thread is transferred at regular intervals alternately to the face and back. The face may be a twill, satin or other weave, while the threads float on the back. These are called reform weaves.

The advantage of such a method as compared with the use of separate sets of threads for the face and back warp are as follows:

1. Greater durability;
2. Uniform take-up;
3. Imperfections in the yarn are less apparent.

Reform weaves were used at first for ladies' dress goods, vestings, and similar goods, but frequently in the reverse order, that is, with the warp floating on the face and stitched on the back. In recent years they have also been used for men's wear worsteds.

As each thread passes to the face and back at regular intervals it follows that two warp threads are required for each thread line of the face weave. When threads 1, 3, 5, 7 etc., form a face twill, threads 2, 4, 6, 8, etc., float on the back; when threads 2, 4, 6, 8, etc., form the adjacent twill line, threads 1, 3, 5, 7, etc., float on the back; consequently two sets of threads are involved.

Following are the rules for constructing the weaves of this class:

FIG. 1143.

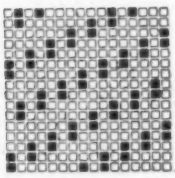

FIG. 1144.

FIG. 1145.

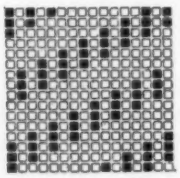

FIG. 1146.

FIG. 1147.

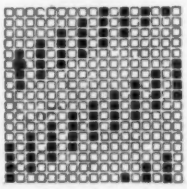

FIG 1148

FIG. 1149.

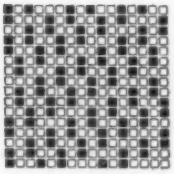

FIG. 1150.

FIG. 1151.

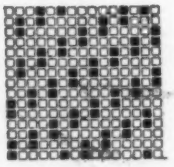

FIG. 1152.

FIG. 1153.

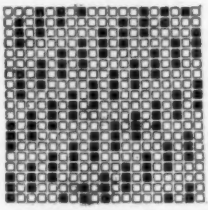

FIG. 1154.

(A) WEAVES IN WHICH THE WARP IS 1 FACE 1 BACK

1. If the weave is an ordinary twill in which the twill line rises one pick at each thread, the number of threads in the pattern is either one more or one less than double the number in the ground weave. Thus, for

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an 8-shaft twill, 15 or 17 threads are required.

A twill is first marked on threads, 1, 3, 5, 7, etc. If the weave pattern is one less than double the number of threads in the ground weave, the second twill is placed on threads, 2, 4, 6, 8, etc., as far above the twill of the adjacent thread as there are threads in the ground weave. Examples are shown at Figs. 1138, 1140 and 1142, the ground weaves being given at Figs. 1137, 1139 and 1141 respectively.

FIG. 1155.

FIG. 1156.

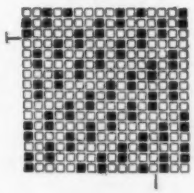


FIG. 1157

FIG. 1158

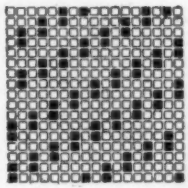


FIG. 1159.

FIG 1160.

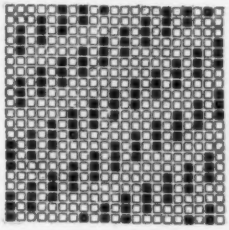


Fig. 1138 is a reform weave made by drafting a 4-leaf twill, Fig. 1137, on 7 threads, the twill line rising 4 picks at every warp thread. Fig. 1140 is a 6-leaf twill, Fig. 1139, drafted on 11 threads, the twill line rising 6 picks at a time. Fig. 1142 is an 8-leaf twill, Fig. 1141, drafted on 15 threads, the twill line rising 8 picks at each warp thread.

If the weave pattern contains one more than double the number of threads in the ground weave, the second twill is placed one more than the number of threads in the ground weave above the twill on the adjacent thread:

For a 4-leaf twill on 9 threads, 5 picks higher, Figs. 1143 and 1144;

For a 6-leaf twill on 13 threads, 7 picks higher, Figs. 1145 and 1146;

For an 8-leaf twill on 17 threads, 9 picks higher, Figs. 1147 and 1148.

2. If each warp thread is brought to the face to form two twill lines while the adjacent thread is floating on the back, the threads in the pattern must number one less or one more than four times the number in the ground weave; for a 4-leaf twill, 15 or 17 threads; for a 6-leaf twill, 23 or 25 threads.

If one thread less than four times the ground weave is selected, the twill on the adjacent thread is placed twice as many

FIG. 1161.

FIG. 1162.

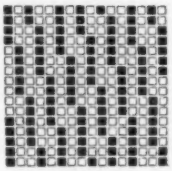


FIG. 1163.

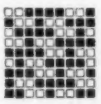


FIG. 1164.

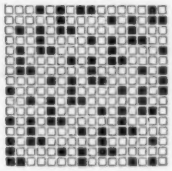


FIG. 1165.

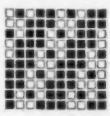
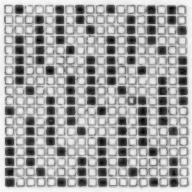


FIG. 1166.



picks above the corresponding twill on the preceding thread as there are threads in the ground weave:

For a 3-leaf twill on 11 threads, 6 picks higher, Figs. 1149 and 1150;

For a 4-leaf twill on 15 threads, 8 picks higher, Figs. 1151 and 1152;

number is 2, 5 or 7-shaft satins for example, likewise for steep twills in which the twill on each warp thread rises two filling threads above the twill on the preceding warp thread, the number of threads in the reform weave is either 2 more or 2 less than double the number of threads in the ground weave;

FIG. 1167.

FIG. 1169.

FIG. 1171.

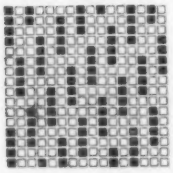
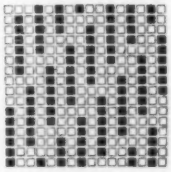


FIG. 1168.



1170.

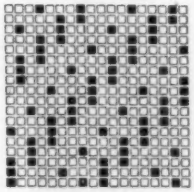


FIG. 1172.

For a 5-leaf twill on 19 threads, 10 picks higher, Figs. 1153 and 1154.

If the reform weave covers one thread more than four times the number of threads in the ground weave, the twill on each thread is placed one more than double the

thus, for a 7-shaft ground weave, 12 or 16 threads, instead of 14 threads.

If the reform weave is two threads less than double the number of threads in the ground weave, the twill is raised on each warp thread as far above the twill of the pre-

FIG. 1173.

FIG. 1175.

FIG. 1177.

FIG. 1179

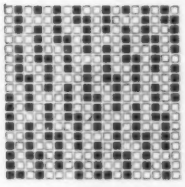


FIG. 1174.

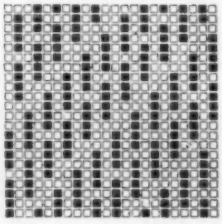


FIG. 1176.

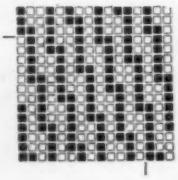


FIG. 1178.

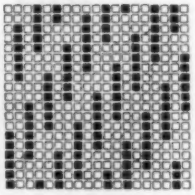


FIG. 1180.

number of threads in the ground weave above the corresponding twill on the preceding thread.

For a 3-leaf twill on 13 threads, 7 picks higher, Figs. 1155 and 1156;

For a 4-leaf twill on 17 threads, 9 picks higher, Figs. 1157 and 1158;

For a 5-leaf twill on 21 threads, 11 picks higher, Figs. 1159 and 1160.

3. For satin weaves in which the rising

ceding warp thread as there are threads in the ground weave:

For a 7-shaft weave on 12 threads, 7 picks higher, Figs. 1161 and 1162;

For a 9-shaft weave on 16 threads, 9 picks higher, Figs. 1163 and 1164;

For a steep twill with 5 threads and 10 picks on a reform weave with 9 threads and 18 picks, 10 picks higher, Figs. 1165 and 1166.

If the reform weave is two threads more than double the number of threads in the ground weave, the twill is set two picks more than the number of threads in the ground weave higher than the twill on the preceding thread:

For a 5-leaf satin on 12 threads, 7 picks higher, Figs. 1167 and 1168;

For a 7-leaf satin on 16 threads, 9 picks higher, Figs. 1169 and 1170;

For a steep twill with 4 threads and 8 picks, on a reform weave with 9 threads and 18 picks, 10 picks higher, Figs. 1171 and 1172.

4. If each warp thread of a satin weave is brought to the face twice in succession before the adjacent thread is raised, the weave will cover either two less or two more than four times the number of threads in the ground weave:

A 5-shaft ground weave will cover 18 or 22 threads in the reform weave.

If the reform weave has two less than four times the number of threads in the ground weave, the twill is raised at each warp thread twice as many picks higher as there are threads in the ground weave:

For a 5-leaf satin on 18 threads, 10 picks higher, Figs. 1173 and 1174. If the reform weave has two more than four times the number of threads in the ground weave, the twill is raised at each warp thread two more than double the number of threads in the ground weave:

For a 5-leaf satin on 22 threads, 12 picks higher, Figs. 1175 and 1176.

5. For ground weaves in which the rising number is 3, such as an 8 or a 10 shaft satin, the threads in the reform weave number three more or three less than double the number of threads in the ground weave. Thus an 8-shaft ground weave would have either 13 or 19 threads in the reform weave.

For an 8-shaft steep twill of this kind on 13 threads, the rising number in the reform weave is 8, equal to the number of threads in the ground weave, Figs. 1177 and 1178.

For the same 8-shaft steep twill on 19 threads, the rising number in the reform weave is 11, which is 3 more than the number of threads in the ground weave, Figs. 1179 and 1180.

COTTON MILL ACCOUNTS

By JOEL HUNTER, C. P. A., 1219 Empire Building, Atlanta, Ga.

A paper read at the meeting of the National Association of Cotton Manufacturers

The purpose of accounts is to record financial history. Aside from the statistical value perhaps the largest measure of usefulness of accounts lies in their freshness. Manifestly it is more interesting to read from the bank account what today's balance is, than what it was two months ago. Correct accounting principles rest upon method. Method is the shortest way to a desired result.

JOEL HUNTER

System combines methods into a general scheme. Therefore we have this prescription for effectiveness.

Today's transactions recorded today	30%
Method	40
System	30
Effectiveness	100

The best accounting system is that which presents accurate information, which discloses complete information and that most frequently and soonest after the actual transactions. Thus an annual financial statement completed ninety days after the balance sheet date is more or less interesting, but viewed as we would regard Confederate States money, with thoughtful interest and rather as a semi-modern relic. A system of accounts used by many cotton mills is based upon the pay roll term, using two fortnightly periods as the monthly unit. This plan meets the generally recognized thirty days, or monthly period, as the settling or casting up date. Ledger balances are

drawn off and liquidations made with creditors and debtors. As a preliminary to framing the proper financial statements, a trial balance of the separate accounts is extracted from the ledger so as to determine the mechanical accuracy of the clerical work. Inventories have been prepared of all the unused purchases of materials and supplies and of the unsold product, both unfinished and finished; the bookkeeper sets them up in their proper places and proceeds to compile the financial statements. In order that these statements may be easily and promptly gotten up, the records should be maintained in such a manner that this compiling may, as nearly as possible, be merely a work of transcribing. It has been found by experience that it is better to carry the record of business transactions in such a style that the detail necessary for the monthly statement falls into related groups. Then these groups separate themselves into the various unit members of the family of accounts, but with an arrangement susceptible of ready reassembling.

Accounts naturally fall into four grand divisions. These are asset, liability, expense and earnings. Fine distinctions are drawn and other names are sometimes used such as resources in place of assets and revenue for earnings, or as in the case of a general trader, sales; but the meaning is practically the same, the nomenclature being determined by the nature of the business. Assets are grouped as fixed or capital assets, current assets and deferred assets. Liabilities are divided in the same way. The expense accounts of a cotton mill resolve themselves into those charges which enter into manufacturing cost, selling expenses and general expenses. Others may crop up, but these are the usual groups, aside from the raw material charges, which, in a way, come under the manufacturing costs, as do the supplies.

Much ingenuity has been exercised in the form and style of books designed to hold the current records, but perhaps the best method is known as the columnar system. A good exponent of this system is seen in the evolution of a record-book known as the cash-journal. This, as its name implies, is a book taking the place of the old-fashioned cash book and journal, arranged with a sufficient number of distributive columns to fit the needs of the business for which it is designed. The plan is to save time in carrying the monthly totals to the ledger in place of many detail postings. Thus the record of bales, pounds and cost of cotton for the month is carried to the ledger in one writing at the end of each month.

The separation of cotton mill operating accounts into the various groups makes for the more intelligent understanding of what the mill is doing. The purpose of this paper is to present a simple yet useful and practical plan of showing the financial operations at a minimum of time and expense with a maximum of result, a system which shall be sufficiently elastic to expand into the more intricate details of ascertaining the cost of numbered yarn and the different widths and weights of cloth, yet allow the investigator to stop at the total average cost per pound and pound (or yard) price of goods sold.

One of the elements of good management is the keeping down of expenses. Unless the expenditure reduces the cost of manufacture or the general expense cost, managers are chary of allowing any more expense to be charged against the business than is absolutely necessary. There are scores of details which have to be considered in finding cotton mill costs and some mill managers do not prove their manufacturing and other costs and their sales of products with their statement of assets and liabilities until the end of the calendar or fiscal year. It has been claimed that there is no urgent necessity to do this more than once a year; but if this were wholly true one might carry the thought further and say, "If we waited this long why trouble about it at all?" The preparation of trustworthy statements and reports takes considerable time and skill coupled with experience. To get out these statements means that some competent persons will have to be engaged several days in each month on such work, which, of course, means additional expense. To obviate this, however, the books and accounts can be laid out in such a systematic manner that after trying-out, and under intelligent supervision, the necessary information from the various departments will almost flow into their respective stations.

The purpose of accounts is to furnish,—not year old history, but financial history—history which will be immediately available to forecast and make provision for periodical financial needs. By periodical, I mean weekly or monthly. Financial settlements are made by the month when not by the week, or for cash. Naturally then, financial statements should review operations by the month, when not oftener. From this it may be seen that while it would be interesting to go into great detail in making up cost statements and compare periodically the cost and production of each card, frame, or loom, yet it is not always commercially practicable to bring it down to such a fine point. It has been found well to work out these costs on general lines. Thus, determine the number of bales of cotton which have been taken into the mill each day and opened. This record is entered on the consumption report. Then so many bales and (or) cuts of cloth come off the looms each day. This is entered with full description on the production report. So much fuel, oil, starch, baling material, repairs parts, and other general supplies have been used today. These are all entered on the report of supplies and repairs. The keeping up with the purchases of supplies and repair parts, together with the issues of such, is a task which, while simple in theory, is difficult in practice, unless there is a regular supply man who has sole charge of them. This record should be kept on large loose leaves arranged in columnar form, suitably headed and designed as a perpetual inventory, showing daily accessions to stock and issues therefrom. Therefore it may be seen that the keeping of a complete record in the office of a cotton mill necessitates a great deal of work with the accompanying expense. Many mill managers fight shy of any additional expense that can be avoided and the result is that in a good many mill offices only such accounts are kept as cannot be dispensed with.

Most accountants agree that it would be well for the management to know each month its ex-

act financial condition as may be disclosed by a statement of assets and liabilities, with the complementary statements of manufacturing cost, general sales (less expense of same), with the gross income account and deductions therefrom. In order to find the costs and values, a systematic account-keeping should be maintained and the reports and statements constructed in the same manner each month.

The average cloth mill spinning its own yarn will find the following chart of accounts to cover its general needs. There may be need of greater detail for some mills, and yet other mills may consider it too comprehensive. Again, others may prefer different captions for the account.

CHART OF ACCOUNTS

Group A. Inventory Accounts

1. Raw cotton.
2. Cotton in process.
3. Yarn.
4. Partly finished cloth.
5. Finished cloth.
6. Supplies.
7. Miscellaneous inventories.

Group B. Manufacturing

I. Productive Labor

8. Superintendent.
9. Opening, picking and carding.
10. Spinning, spooling and warping.
11. Slashing and drawing in.
12. Weaving.
13. Cloth room.
14. Miscellaneous productive labor.

II. General

15. Machine shop.
16. Steam plant or power.
17. Yard.
18. Overhead.
19. Machinery repairs.
20. Depreciation.
21. Miscellaneous general labor.

Group C. General Expense or Administrative Accounts

22. Salaries.
23. Office expenses.
24. Interest.
25. Insurance.
26. Taxes.
27. Repair mill buildings.
28. Repair tenant houses.
29. Miscellaneous expenses.

Group D. Selling Expenses

30. Freight out.
31. Drayage.
32. Commissions and discount.
33. Samples.
34. Other selling expenses.

Group E. Store Accounts

35. Store purchases.
36. Store expenses.
37. Store sales.
38. Store accounts receivable.

Group F. Sales Accounts

39. Cloth sales.
40. Miscellaneous sales.
41. Waste sales.

Group G. Other Income Accounts

42. Rent receipts tenant houses.
43. Miscellaneous receipts.

As the basis of account keeping lies in altering forms without changing values, it will be interesting to review the economic principles contemplated in this list of accounts. For convenience we will adhere to the idea of which the general ledger is the embodiment. That is we will charge to the proper account that which is received by or transferred to it and credit to the proper account that which is taken away or transferred from it.

1. RAW COTTON

To be charged with the inventory at first of period and the cost, freight and drayage, storage and other direct charges of cotton purchased. The loss on hedges is a proper charge also, but where monthly or quarterly statistics are prepared, such charges make violent fluctuations in the pound averages as compiled periodically. To so great an extent is this true, especially where the loss is heavy, that it is considered to be the better policy to carry the hedges account until the end of the fiscal year and then transfer it direct to the profit and loss account. The same reasoning would apply if the hedges transactions resulted in a profit.

2. COTTON IN PROCESS

To be charged with inventory at first of the period and with the cost of the cotton in process. If it is desired, the distinction can be drawn here very finely and say that cotton in process consists of the cost of cotton plus labor, waste, supply, depreciation, interest upon the investment and other visible charges, if any, up to the spinning. These are the elements that would make up the inventory value of the cotton in process. It is closed out at the end of the period by an inventory prepared similarly to the one at the first of the period.

3. YARN

To be charged with the inventory of yarn at the first of the period made up at the cost of yarn. This would be based upon the cost of the cotton in process, to which would be added the cost of yarn, arrived at in practically the same manner as the cost of cotton in process. Closed out at end of period like cotton in process.

4. PARTLY FINISHED OR UNFINISHED CLOTH

Charged with inventory at first and closed out at end of period by inventory at last. The cost of the unfinished cloth would be the same as the cost of the finished cloth, except of course, the cost of finishing. This is cloth room labor, baling, casing, supplies and miscellaneous charges.

5. FINISHED CLOTH

Charged with inventory at first and closed out with inventory at last. Most mills separate their inventory accounts (up to No. 5) into raw material, cotton in process, and unfinished and finished goods. (Waste is considered under sales

accounts.) The additional one of yarn is described to show how it should be treated if desired to carry it.

The cost of the finished cloth is varied at by charging

First. The cost of raw material

Second. Plus the waste loss.

Third. Less the value of the sales of waste.

Fourth. Plus (or minus) the difference in the process inventories.

Fifth. Plus the manufacturing cost.

The distinction is made here, and it is the viewpoint of this paper, that the manufacturing cost does not include the general expense, or the regular charges against net income such as interest, taxes and the like. It is our purpose to hold manufacturing cost to the twenty-one accounts previously described.

6. SUPPLIES

Charged with the inventory at the first of the period and closed out with the inventory at last. Comparatively few cotton mills keep a complete and proper record of supplies. Doubtless there may be what seems to be good reasons for this, but where the cost runs up to considerable value, it would appear to be good judgment to keep an exact account of the receipt and issue of general supplies and repair parts. The loose leaf or card system is well adapted to a record of this kind. I have seen an excellent example of this as keeping tab on, say, loom parts. The sheet should be ruled appropriately to take care of the date, number, and name or description of the part. After a record keeping system of this kind is installed and begun, it is not as troublesome to maintain as this description might imply.

7. MISCELLANEOUS INVENTORIES

This is to cover any other kind of material or supply thought necessary to separate from those already considered.

COTTON PURCHASES

See 1. Raw Cotton.

In some mills it is found desirable to keep a separate account of cotton purchased from that of raw cotton inventory. In any case it is simply a division of the same material value. Cotton purchased should, of course, be charged with all of the raw material bought and the freight also, unless, as explained above, it is desired to carry these accessory charges on separate accounts. Some mills, whose accounting department is well developed, have adopted the idea of crediting this account with the cotton opened. It is a good plan to reweigh cotton immediately before opening it. This brings out the "wet" loss and is also an effective check. It will be found invaluable in the preparation of the waste statistics. All possible information of this kind is valuable to the management as it may well lead to "tightening up" any loosenesses, and hence economic saving. The credit of cotton opened to cotton purchased account should be on the basis of the invoice weight and if not the invoice cost, then at least the average cost. The consumption record should carry a column for reweights, as well as for invoice weights. When properly maintained, then, this cotton purchased account becomes a current inventory account for the cotton.

GROUP O

The general expense or administrative costs are covered by accounts numbered twenty-two to twenty-nine. These are the usual ones incident to a mill.

GENERAL

The remaining accounts consist of the selling expenses, the store accounts, the sales accounts and other income accounts. They are all so well known as not to need any discussion, except perhaps the waste account.

WASTE

It may be said that waste being unescapable, there is not much use in attempting to follow it out, but this is only partly true. Perhaps a certain percentage may be established as bagging and tie waste, as flyings from the cards, as motes, sweepings and thread waste, but even if for no other reason than keeping down this percentage, should a continuous scrutiny and periodic examination be made of it. To those mills manufacturing a class of goods where the sizing reduces the net waste in weight, it becomes a matter of interesting enquiry to compare monthly or quarterly reports. For instance, if in a certain period the production of visible waste was 200,481 pounds on a total cotton consumption of 1,951,430 pounds, the percentage would be 10 1/4 per cent.

Then if the total production of finished goods was .....lbs.	1,785,750
Total visible waste	200,481
Total weight gotten out	1,986,231
And the total consumption being	1,951,430
We may see that the net waste has been overcome by	34,801

The question then is, what is the total waste? With the knowledge of the weight of the visible waste and the weight of sizing, we may easily establish the total waste. The weight of the sizing material, deducted from the finished goods weight, would furnish a figure from which we could determine the real waste. Such statistics properly prepared gives valuable standards for comparison.

CONCLUSION

The salient features of this system bring out correctly the following points:

1. The prime cost of cotton, meaning by this, invoice cost, freight, and drayage.

2. The increase due to waste. Remember that we do not desire to make waste, we cannot help it.

3. The manufacturing cost.

These three make the total prime and manufacturing cost, including waste.

4. The general cost. This covering all the other costs not previously considered except

5. The selling expenses, which are, in the true sense, a proper deduction from sales.

These five consolidated make the total of all costs, which deducted from the price per pound of cloth sold, etc., enables us to reach at last our final goal, the manufacturing profit per pound of cloth made and (or) sold.

ENGLISH NOTES

By Our Regular Correspondent

To a few in the English cotton industry the American market for piece goods is of importance, but to the many it has been latterly a destination of no particular concern. Last year 6,912,625,800 yards of cotton cloth were exported and 48,120,000 yards were declared as going to the United States. The proportion is less than three-quarters of one per cent. in quantity and it is a matter of statistical record that thirty individual markets surpassed the American in this respect. Even little Roumania received more English cotton cloth than the broad United States. The shipment was not quite so insignificant in regard of value, as of the total of $458,000,000, the American market accounted for a little over $8 1/2 millions. Sixteen recorded destinations each took larger values individually. The figures explain in part the absence of any signs of excitement in Lancashire over recent American events. Looms are not short of work and demand from America has to increase a great deal before becoming a matter of universal importance in the English cotton trade. There is nothing more definite to report than an expectation that new opportunities of trading will arise under the reduced tariff. Time and fashion are left to determine what direction the new trade will take. Black cotton linings and mercerized wash goods, together with some novelty cloths, are the fabrics that have been customarily sent and the new tariff is obviously much more favorable to these. All experience teaches English textile men that tariffs cannot be changed either upwards or downwards without provoking unanticipated as well as anticipated effects. Months and even years pass before these possibilities disclose themselves and become exploited.

* * *

The wool industries are very much smaller in Great Britain than the industry in cotton. Exact comparison of sizes is difficult to make, but it can be said that woolen and worsted employ less than half as many people and the export of wool piece goods is not one-quarter the value of the cotton cloth. There is thus an altogether different scale on which to measure the importance of American demand. On the 1912 basis the United States take 2 per cent. by volume of the exports of British carded woolens and a little over 3 per cent. by value. Of the worsted tissues exported America takes 14 per cent. by volume and rather less than 9 per cent. by value. The figures suffice to show that the market is of more importance relatively to persons engaged in wool than in cotton manufacturing in England. Enlarged demands for fabrics tell more heavily upon a smaller industry than on a larger one and it is not solely by demand for fabrics that the English wool industry expects to be disturbed. Free wool in America, so far as it implies higher prices in the raw market, intimately affects all parties here. The lower duties promise a larger trade in manufactures, so there are two solid considerations of the most widespread concern. Beyond and distinct from these, the settlement of the tariff details arouses another emotion that Americans should not find it hard to understand. People engaged in the export of wool and goods to the American market have been looking forward to the time at which any rate should finally be fixed and remove the baffling uncertainty that has been complicating trade. These parties have been praying for certainty at almost any cost. Under all the conditions that ever have obtained they have been able to do more or less business with America, but uncertainty has been preventing them almost from doing any. To them any settlement means relief.

* * *

In woolens as in cottons much is left to arbitrament by time. Our high-grade worsteds and tweeds, dress goods and linings are fairly well known to all parties and the Underwood rates promise larger business in those lines in which trade is already established. The question is in what other wool goods will the new conditions make possible new business. Makers of cheap fancy woolens think that their goods will come in, although the particular styles and qualities cannot be identified in advance. They take

as their guiding point the instance of Canada, a market for 11,909,600 yards of carded woolens last year, or say $7 millions worth. Accepting that record it would seem that they base their ideas on goods of an average 58 cents a yard. There are, of course, both cheaper and dearer woolens, but the average will serve as a rough index. At present these goods sell to the very limit of the productive capacity of the mills and not even another Canadian market could be met without extension of plants. If it be asked whether the Colne Valley tweed makers will enlarge their mills to grapple with the prospective American demand it can be answered that men in an excellent position to know think that they will do so and that a large but possibly short-lived trade will grow up. A big trade in cheap carded woolens lasting three or four years is a typical prediction.

* * *

Makers of worsted serges and fancy worsteds are expecting to do a larger trade under a 35 per cent. duty than under a tariff which practically doubled the cost of their goods. Importers are inquiring for names of manufacturers of these fabrics and manufacturers are asking for the names of good importers. Certain well known mills have cultivated the American market consistently and now makers who have not given it special attention in recent years are beginning to take notes about it. Some of them have been asked to supply particulars of all goods they could deliver immediately on the signing of the bill. All conditions have been against the accumulation of large stocks. Demand has been good, prices have ruled too high to make heavy stocks desirable and strikes and other causes have thrown manufacturers behindhand in deliveries. As a general rule the time required for delivery of goods to be made is six months from the date of the order. There are thus strict limits to the quantity of woolens, worsteds and dress goods that can be rushed into America immediately on the giving of a signal. All round, the minimum times for delivery are much longer than a few years ago, partly as a consequence of increasing business and partly because of the greatly increased number of styles that manufacturers have to produce in these days.

* * *

In 1895 there were sent to America from the Bradford consular district some $630,000 of worsted and mohair yarn and in two years subsequent to the last free-wool era the amount was about one-tenth as much. Latterly it has been about $10,000. Men who were engaged in the export in 1895-97 would not be surprised by a revival of demand, but its extent and direction cannot be foreseen. Crossbred, mohair and alpaca yarns are the varieties that Bradford reports to the Continent and spinners of them are in need of orders, but good botany spinners are all engaged long in advance. Worsted tops were bought for America in 1897 to an amount over $1 1/4 millions, since when the trade has been insignificant. Topmakers are ready to sell either tops or wool according to the rate of profit realizable and they fully expect to do business in combed wool under the 15 per cent. duty. There is an art in topmaking as in most things and the unpracticed English dealer who sends wool to comb in the expectation of doing better than in simply selling wool sorted is almost invariably disappointed over his transaction. Rightly or wrongly, Bradford topmakers believe they have had better experience than most Americans in the art of blending and for a time this should stand them in good stead.

* * *

It is obvious that in attending more or less to all markets, English textile manufacturers have applied themselves to problems that have not arisen, at least in the same form, in the United States. Some of the difficulties took long to conquer and might be expected to take any other race of manufacturers long also. Differences of experience may be admitted freely on both hands without disgrace. Ability is a separate consideration and if it were asked what British opinion really is as to the comparative ability of American manufacturers, it would have to be replied that generally those who have come into closest touch with the American textile industry rate that ability highest. It is very

strongly believed that American textile manufacturers will be much more potent competitors with English ones, say half a dozen years from today. This opinion is held by many and it has been given in conversation by two men both of whom have American as well as English manufacturing establishments. It has been no uncommon thing in past years for English manufacturers to bring back from America an appreciably higher estimate of American skill than they carried on the outward journey.

* * *

Section II of the Tariff Act with all its elaborate rules for the determination of dutiable value has not as yet been fully digested by manufacturers. Some of them say that the Customs already deal with declared values pretty much as they please and it is recognized that as much depends on the spirit in which regulations are administered as upon the literal text of the law. Several considerations affect "actual market values or wholesale price at some given moment. One has only to mention such matters as promptitude of delivery, fine distinctions of finish, color, style, quality and purpose to recall how complex the question is. Many goods can be copied at lower prices than the original maker is willing to accept and even in goods like plain indigo worsted serges, of a nominal 648 quality, one maker's price will be $1.32 and another's $1.44; while from people not far away it is regularly possible to buy a close imitation at $1.20. In 15/16 oz. fancy worsteds a cloth will sell at $1.20 or $1.50 according as to how and by whom it is made. The differences are not easily reducible to fixed rules. These variations are enough to show that in some circumstances prices for nearly identical articles differ materially. There should be very little difficulty in satisfying an investigator as to the price of a standard make, but there are always new sorts appearing. As the cheaper these seem the better they sell the new regulations cannot mean less uncertainty as to the Customs decision.

* * *

Resist dyeing by one system or another has been practiced here certainly for more than one century, but in using chemical resistants on wool to produce fancy effects in piece-dyeing worsted cloth, England has followed in American footsteps. Apparently the process is falling out of use in men's worsteds of the highest grade, although extending in the cheaper qualities. Probably a good deal will be seen next year of suitings in cinnamon, tan, slate, smoke and green shades with resist line stripes. Broader and closer silk self-colored stripes, with or without polka dots, are among the fancied styles for young men in 1914. The popular whip cord is being varied with a herringbone rib. Covert cloths for light overcoats are well favored. Small checks and gun-club effects are the coming styles in the best classes of fancy worsteds.

In women's goods, whipcords and Bedford cords are the things both of the present and the visible future. The diagonals and cords are likely to be bolder and broader for next year and they appear in goods of every class and quality from the cheapest to the richest. Jacquard figures are beginning to creep back into favor, now that most of the loom harness has been dismounted and something is heard also in favor of embroidered designs. The taste for figures remains to be developed more fully, but there is no gainsaying the passion for diagonals and cords.

* * *

Notice of a four per cent. advance in rail freights is the latest addition to costs in this country, where in consequence of recent movements standing charges have advanced a great deal. Compulsory sickness insurance added to the burden already imposed on employers by the workmen's compensation Act and no doubt the compulsory deduction from wages have had their effect in stirring up new labor demands. All classes of operatives in the wool industry are pressing for more wages and in general are getting them. The ring spinners of Lancashire and the cotton doublers in Yorkshire have got their new lists and the dyers have their 14 cents an hour, wool sorters and combers have had to be pacified with new advances, Bradford weavers have in some cases got the full 15 per cent. demanded and the weaving over-

lookers of Bradford are likely to secure their minimum $9.60 a week. Children fresh from school command their $2.50 now from worsted spinners and these wages to juniors promote discontent among the older girls. The ferment is very disturbing and is not accompanied by the doing of more or better work. Quite the contrary, for the help has become much less manageable. Profit margins are not improving, because it is not easy simultaneously to get back the increased wages cost and recover the whole excess price of raw materials. It follows that a large number of employers feel they are not getting adequate returns in view of the amount of business done and the increasing trouble of getting through it.

TEXTILE SCHOOL PRODUCTIONS

By J. DUMVILLE, Bradford, Eng.

The question as to whether a technical school should be allowed to supply yarn and fabrics to municipal departments, such as uniform cloth for the tramway and police departments, and knitting yarns for the ordinary elementary school, is a matter of considerable interest to all interested in the control and management of these institutions. It must be acknowledged that up to the present the proposal has been received very unfavorably by many friends of technical education. Notwithstanding this, the opposition seems to be based on a somewhat narrow view of the aims of a fully equipped textile department.

No one desires that such schools should exercise commercial functions or enter the field of industrial competition, although it seems as if an increase in a commercial spirit among those responsible for the management of the schools would not be without advantage to students, teachers and tax payers.

Very valuable machinery has been installed in some of our technical schools. The object must have been to give a better opportunity for practical demonstration of all the processes necessary to bring raw material into the manufactured state and to make the theoretical teaching of the institution of increased value. The demand today is that our students should be turned out better equipped from the practical and commercial standpoint, and that there should exist in the arrangements of the school, conditions which will enable a student at the end of his course to take to the firm into which he is introduced, not only wide theoretical knowledge, but practical dexterity of value to his employer. This can only be done by the best use of all the machines provided. In a fully equipped textile school there is a variety of machinery unequaled by any private firm in the trade. To work such a plant efficiently it must be set occasionally to produce material up to trade standards.

It should also be borne in mind by those who object to this suggestion, that under the very best conditions only a small portion of the time of students can be occupied in producing yarn and fabric for commercial lines. The time of students must be devoted largely to class and tutorial work, to the study of materials and the principles underlying their manipulation, to adjusting, dismantling and reerecting the machines and acquiring knowledge as to methods of working. Besides these studies, which may be termed theoretical, a considerable part of the student's time must be spent in the educative work of detecting, analyzing and remedying the mechanical and material defects developed in their experiments. Notwithstanding all this there should be time devoted to producing work similar to that placed on the market by the trade. This is very essential for full time students who have not the advantage of the part time or evening student of being actively associated with competitive conditions. For advanced students who are nearing the end of their course nothing could be more helpful to them or a better preparation for the responsible work they are soon to take up, than that the last few months of their college time should be spent in carrying material of various qualities through all the operations, from the raw state to the finished article. If such products are occasionally to be placed under the critical eye of the expert buyers of other branches of the municipality, a test of the ultimate value of teaching received at the college would be obtained, which should not

be unimportant to the governing committee. The extent of the student's theoretical knowledge is frequently tested. Why not establish means of fixing the value of the practical instruction imparted by the staff?

There seems no more encroachment on the rights of the private trader in selling a fraction of a textile department's production, say to the tramway or gas company, than in a spinning department of a college supplying its own weaving section with yarns. There is also another side to this question. Committees insist, and rightly so, that their staff shall be practical men, capable of obtaining the best results from any material submitted to them. What more satisfactory method of "examining" the staff than that obtained by submitting their products periodically to the criticism of the friendly or unfriendly outsider?

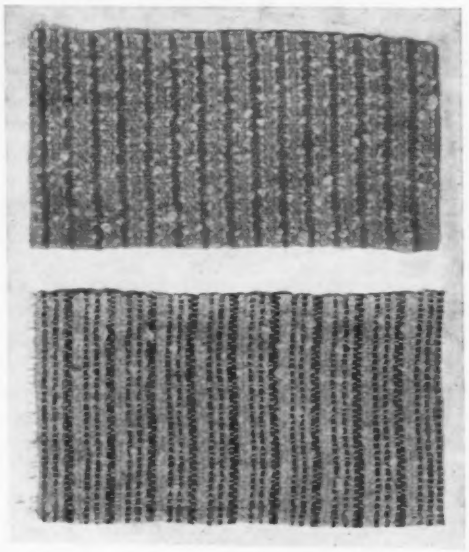
Until the problem is solved, how to link up the technical college to activities of the factory and workshop, there should be found, not only a good supply of various materials for experimental purposes, but small bulk lots to be produced on commercial lines with a market opened for their free entry into comparison with the product of the private trader.

PREPARING FOR THE NEW TARIFF

(From an Occasional Correspondent.)

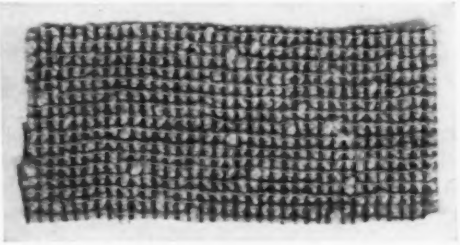
Manchester, Eng., April 28, 1913.

No buying for America has started yet, but I am informed that about a score of buyers are in London lying in wait and with credits opened. Their reported intentions is to arrange for large deliveries immediately the tariff settlement is prospect and to get goods in before American mills have time to make any. Conditions are not very favorable to this plan as there is not much stock and they will have to give six months' time to Bradford makers. I know that one very large maker of fine worsted serges is putting some looms on short time rather than stock goods against the prospective American demand. Buyers are not likely to find goods cheap when they do resolve to come in. To judge from conversation with a representative man in Huddersfield yesterday the large fancy woolen firms of the Colne Valley are well persuaded that they will be able to do business under any revenue tariff. They are also very full of work and could accommodate an American demand only by mill extensions. I am fully of the opinion that



SAMPLES OF RATINE

American manufacturers have not much to fear for some months from English competition. I enclose samples of novelty cotton



SAMPLE OF SPONGE CLOTH

goods such as ratines and sponge cloths which have been recently exported in fair quantities to the United States. The trade expects the Underwood rates will be more favorable than the Payne tariff on these goods. There seems no reason to doubt that the Underwood bill saved Bradford from a little slump in wool. Importers were much embarrassed by tight money, high prices and abnormally large arrivals. The prospect of American demands for wool gave them heart. Now the worst is over, higher prices are thought to be inevitable.

Questions and Answers

Under this head we undertake to answer, free of charge, to the best of our ability, questions pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

If the question is not of general interest to textile readers and involves expensive investigation, a charge covering the cost may be made, of which the inquirer will be advised before any expense is incurred.

SIZING FOR VOILE YARN

Editor Textile World Record:

We have been making voile yarn and there has been so much twist put in it that we could not slash it. The moment it got near the size box it came out like tape. I think there are 46 turns of twist to the inch. We finally had to weave it without any size. Is there any size that we can use to overcome this difficulty? Ohio (2175).

We referred this question to our French correspondent, who sends us the following reply with three samples of worsted yarn such as is used in France for the manufacture of voile:

I am sending you under separate cover three samples of single and ply worsted yarn used in the manufacture of voile. Some of the yarn has been gassed. The samples are as follows: M. Masse spinner, Corbie (Somme) 2/136s; M. M. Luglien, Leroy & Co., Frevent, Calais; M. M. F. Masurel Bros., Tourcoing, Nord, 2/98 gassed and 3/60s grey.

The warp yarn for voiles is always sized carefully. A vegetable sizing material called "Senegaline" is used for this purpose. It comes in powder form and is absolutely neutral and is prepared in Germany. It makes the glue fluid and very flexible. Following is a formula, the quantity being given by weight:

100	parts	Water.
10	parts	Fecula.
2	parts	Senegaline.
.2	parts	Soda.
112.2	parts.	

This mixture is used very hot, from 140° to 160° F. The warp should be kept under a very uniform tension when being sized. The twist in the yarn does not exceed 40 turns per inch. Gaul.

MANUFACTURING A LENO FABRIC

Editor Textile World Record:

We are enclosing sample of a fabric, Fig. 1, which we would like to make. Is it necessary to have a special machine for making this material? Do you know of any other way of weaving it than with a double slackener? There is always more or less trouble with a double slackener and if we could find some arrangement that would be more reliable, we would like to know of one.

Manufacturer (2187).

No special machine is required for the manufacture of the sample of leno fabric,

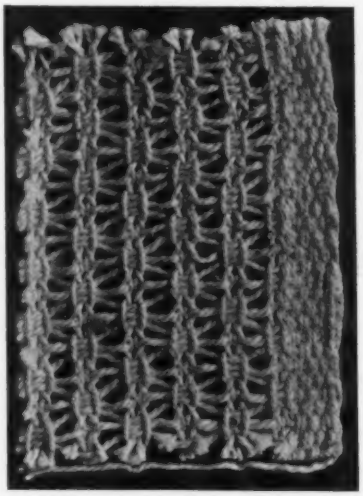


FIG. 1

Fig. 1, but extra attachments are necessary in order to make it on a regular dobby. These additional motions include a doup, half motion attachment, a double yoke and a jumper motion. I have made a few sketches which I think will illustrate the principle of manufacture. Fig. 2 shows the drawing-in draft; Figs. 3 and 4 are chain plans. Fig. 3 will be used when the double yoke is used, and Fig. 4 when half motion

attachment is used. Fig. 7 shows how the doup should be connected to the double yoke. Two harness levers in the dobby operate

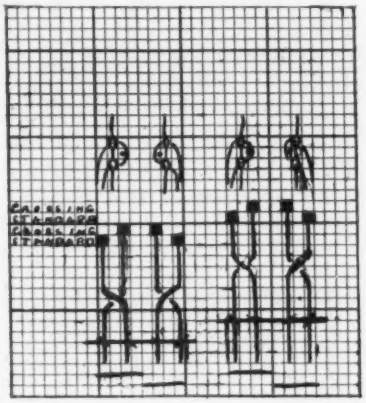


FIG. 2

this motion, as will be seen. Fig. 8 shows the doup through the doup heddle, the dot representing the end passing through the

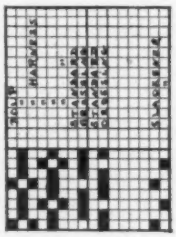


FIG. 3

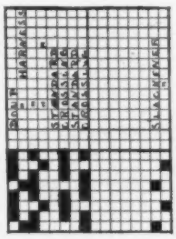


FIG. 4

doup. The cross shows where the standard end will be, above the doup and between the doup and doup heddle.

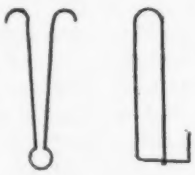


FIG 5 FIG 6

When the half motion attachment is used, the harness for the doup is connected to the harness lever in the dobby as for a regular harness. Both these motions are used to keep the doups from kinking when changing from a doup pick to a crossed pick. The double yoke is about six inches long, but the half motion attachment is simply a piece of wire bent so as to fit on the harness lever to connect and raise the doup lever when the doup harness lever is being raised.

Fig. 9 shows a jumper motion. The

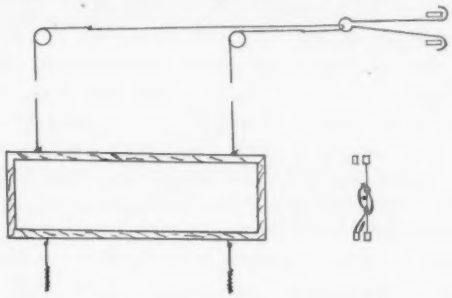


FIG. 7 FIG. 8

standard harness is connected directly to this motion and is raised only half the distance in the shed to allow the crossing end

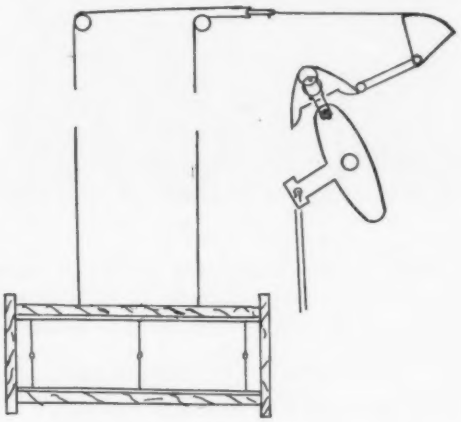


FIG. 9

to pass under easily. There are different makes of jumpers, many mills using home-made ones which answer the purpose very well. The object in all jumpers is to raise the standard harness sufficient to allow the crossing end to pass under easily, for it will be noticed in the chain plan, Figs. 3 and 4, that the standard harness is never raised by the dobby.

I have never heard of a leno being made without a slackener. If there are two sets of doups, which is necessary for this fabric, then two slackeners will be required to ease

off the yarn on the crossed picks. There should not be any trouble at all with the slackness if they are set right. The spring which is connected to the lifting arm of the slackener should be strong enough to pull the yarn back to its regular position after having been raised to ease off the yarn for the crossed pick.

The enclosed sample of cloth, Fig. 10, which I am now making, has two sets of doups and two slackeners and I have had no trouble with the slackener. The two methods of connecting the doups are also used, that is, for one doup the half motion attachment and for the other doup the double yoke is used. In the sample submitted by "Manufacturer" I would suggest the use of ramie twine for the doups because of its strength and durability. Wasco.

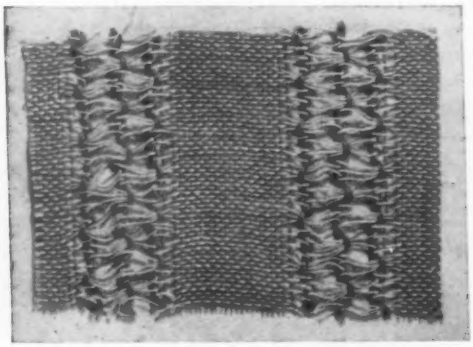


FIG. 10.

A LENO TWIST IN THE FILLING

Editor Textile World Record:

We note on page 141 of your April issue a reply to a question regarding a leno fabric, in which "Jean Paul" says he has given this matter considerable thought, but can find no method of making the twist in the filling to give the effect shown in Fig. 1, which shows the warp cords running straight and the filling twisted. We do not wonder at this, as it is rather unusual to run the warp cord straight and make the twist in the filling. This has usually been done by hand after the cloth was woven. We have been working for more than a year to get the same effect on a power loom. We now have our device perfected so that it is a commercial success and are applying for a patent. On account of the patent situation we are unable to inform you just the method we take to get this effect, so we will not attempt to go into details at the present time. No doubt, however, you will see goods of this character in the market in a very short time, as we cannot only put the cord in straight, but we can wrap it entirely around any number of filling threads, also twist or wind the cord around in various ways.

Yours very truly,

John L. Burton, Agent.

PREVENTING INJURY FROM X-RAYS BY THE USE OF WEIGHTED SILK

Editor Textile World Record:

Sometime ago I ran across the following dispatch dated Paris:

"A discovery that is expected to remove the danger to which manipulators of the X-ray have been subjected in its handling was announced today at the Academy of Sciences by M. S. G. Droit. In his experiments, M. Droit was impressed with the remarkable capacity of silk to absorb considerable quantities of metallic substances while being dyed. With the aid of two silk manufacturers M. Droit succeeded in getting a piece of silk heavily charged with lead and other substances, which proved an impenetrable armor against the rays. One piece of charged silk weighs 8 ounces to the square yard. With six thicknesses of this silk M. Droit fashioned a short glove which he has used successfully in handling X-rays. The glove possesses the double advantage of suppleness and protection against the rays. M. Droit says that repeated tests have proved the complete efficacy of the glove in warding off injury to handlers of X-rays and he expects it to greatly facilitate examinations and experiments with them." Maywood (2160).

We referred this inquiry to our French correspondent who replies as follows: Taking advantage of the absorbing power of silk, dyers have succeeded in fixing on this material a large number of different products. In this way the weight can be increased not only to offset the loss in boiling off, but to give a considerable gain in the weight of the material. The increase in weight has heretofore been the main object of this process. The session of the Academy of Sciences at Paris on Oct. 4, 1912, announced that S. G. Droit had proposed a new use for weighted silks. M. Droit utilized the power of silk to absorb metallic substances in obtaining a weighted silk that would protect the person against

the injurious effects of frequent exposure to the X-rays. With the assistance of M. M. Guicherd and Sisley of Lyons, he obtained a schappe silk fabric containing at least 68 per cent. of phosphostannate of lead and weighed 8 ounces to the square yard. M. Droit made a glove with six thicknesses of the weighed fabric with which he handled the X-ray apparatus, exposing his hands to the rays. This glove had the advantage of being very soft and pliable and yet in its power of resisting rays being equal to sheet of copper 1/100 inch thick. For mild rays and for operators who have never previously been exposed to the X-rays it is believed that two or three thicknesses of the cloth would be sufficient. It is believed that silk fabrics with less weighting than 68 per cent. will give good results as a protection against the X-rays. Owing to the much greater surface of the fibers the metal in the silk is in a form entirely different from that produced by galvanization. In the latter case the metal is a thin sheet, while the absorption of the metal by the fibers results in a vast increase in the power of resisting the rays. Robert Dantzer.

SIZE OF BOBBIN FOR SPINNING YARN

Editor Textile World Record:

What would be the best size bobbin to use for spinning 60s cotton yarn with 1 9/16 inch ring. The bobbin which I am using for this work is 8 inches long and 1/2 inch thick. While it is making very good 60s yarn, I think the spinning could be improved by using a thicker and shorter bobbin. Westward (2166).

As a bobbin 1/2 inch in diameter is used, I infer that warp yarn is being spun. The diameter of the ring is as large as should be used in spinning 60s warp. It is desirable to make a bobbin containing as large an amount of yarn as possible in order to keep the spinning production up. If there is too great a difference between the diameters of the ring and empty bobbin it is very difficult to regulate properly the tension at all stages of the build of the bobbin. This would lead to bad spinning, weak yarn, waste and irregularities in twist.

The same would be true if the traverse were too long. When winding at the bottom of the bobbin the traveler would have to be heavy enough to prevent excessive ballooning and with a long traverse this would cause excessive tension when winding at the top. This would cause weak yarns, tend toward unevenness in size and twist, and also cause an excessive breaking of ends. Such conditions as these might exist if a bobbin 8 inches long were used on 60s. Better results would be obtained if this bobbin were reduced to 7 inches or even to 6 inches in length.

If the yarn spools well and gives no trouble I should make no change in the diameter of the empty bobbin. If the frames are constantly being changed to any great difference in numbers, they should be put on coarser numbers owing to the size of ring. In this case the 8-inch bobbins might give satisfactory results. On 60s a bobbin 6 inches long and 1/2 inch in diameter would cause the spinning to run better, the yarn to break more even, and produce less waste than would be the case if an 8-inch bobbin were used. Leander.

In this case the bobbin is 1/2 inch in diameter and the ring 1 9/16 inches in diameter. From the center of the bobbin to the inside of the ring is 1/2 of 1 9/16 or 25/32 inches. From the center of the bobbin to outside of bobbin is 1/4 inch. Then, $25/32 - 8/32 = 17/32$ inches, from outside of bobbin to inside of ring or the distance the yarn has to pass from ring to bobbin. This is excessive for 60s yarn. A 3/4-inch bobbin would be much better as it would leave only 13/32 inches, which is 1/8 inch less than with the 1/2-inch bobbin.

The traverse is also too long. More ends break down when the ring rail is at the bottom of the traverse than when it is at the top with either a warp or filling wind. On a seven-inch traverse the yarn pull is seven inches longer when the ring rail is at the bottom than when at the top, which causes more strain and pull on the yarn making the weaker ends break down. A shorter traverse would decrease the broken ends.

If different numbers of yarn are run in the same room and it is not convenient to have bobbins of different sizes for the finer numbers, I would advise having a smaller ring for the finer counts.

To improve the spinning and run at a

higher speed the yarn pull should be reduced by shortening the traverse and the distance between bobbin and ring within reasonable limits. In the case cited above I recommend a 3/4-inch bobbin, 7 inches long, or a corresponding decrease in the ring with a 6 or 6 1/2-inch traverse. This would improve the spinning and result in a greater production. Winton.

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FINISHING WOOL GOODS

Editor Textile World Record:

I would like some information in regard to the comparative merits of the different methods of finishing high grade woolen goods by decatizing, London shrinking, pressing with hollow plates or with the latest improved rotary presses. I presume the last method is the cheapest, but goods finished on a rotary press will shrink more or less in sponging. I wish to ascertain which of these methods is in the most general use in high grade mills, also the comparative cost of installing and operating. Thebes (2174).

Our English correspondent replies as follows:

The different methods named all have their uses and advantages, but it is impossible to consider them as interchangeable, or capable of producing identical effects upon any one class of goods. In England, "London shrinking" means sponging. It is a clear addendum to the regular routine of finishing and is done at the instance of the buyer by commission shrinkers. The fully-finished fabric is wrapped between wet cloths, or is damped between wetting rollers in a machine, and is left to dry in air. The work is done to ensure that the cloth shall not shrink in the garment and to remove press-glaze. It is a tailor's process, not a manufacturer's one.

Decatizing machines are used in Yorkshire sometimes as crabs to set cloth before dyeing. They are employed in finishing operations to obtain a high degree of luster, an immunity from spotting with rain and a soft handle. Their chief service is in finishing face cloths and most Yorkshire makers of fine dress worsteds now have these machines. After decatizing, the clothes are put into folds, papered and cramped overnight in a plain hydraulic press, to produce the requisite folds.

The hollow-plate press is used in some quarters for coatings, but it is most largely employed for linings and dress goods. Moreens and moirettes are watered in Bradford in these steam-connected presses instead of in the old-fashioned calenders. Italian linings, alpacas and mohairs are treated in them to produce a high finish and mellow handle. The goods are pressed a sufficient length of time with steam in the hollow plates and the steam is turned off and replaced by cold water at the same time that the rain pressure is increased. The hollow plate is a substitute for the plain press in which solid, hot plates are employed.

Rotary presses are used for cheap woolens and for worsted dress goods in Yorkshire, but the handle they give to men's worsteds is not approved and in the high grade English mills the plain vertical press is used alone. The goods are hot-pressed and, if need be, steamed and then cold-pressed. The question of what to use is a question of the kind of goods made and effect sought. If the glaze and handle of rotary pressing are acceptable this method is doubtless the most advantageous in cost of operation. James Strand.

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LOCATION OF WINDOWS IN A TEXTILE MILL

We are planning an extension to our mill and would like to have information regarding the best method of arranging the windows.

Editor Textile World Record:

Factory (2162).

We referred this question to Fred S. Hinds, mill architect and engineer, 19 Milk St., Boston, Mass., and he replies as follows:

"On account of building the mills wider, it has become necessary to make the windows as wide as possible between the supporting pilasters of brick. The distance varies from 8 ft. to 9 1/2 ft. If the stories average 15 ft. high from floor to floor, the height of the windows would be about 12 to 13 ft. with one good sized ventilating sash at top and bottom, although some mills use them only at the top. For these windows, which are designed to be from 10 ft. 6 in. to 12 ft. on centers, the most common practice is to have the main sash stationary with a thin mullion between the two sashes and two toplights above these with a cross transom between the mullion and the jamb. If the mill is to be constructed of reinforced concrete, a much wider window would be designed, depending upon the method of framing and spacing the concrete."

UNDULATING WEAVE EFFECTS

Editor Textile World Record:

I enclose a sample of cotton cloth, Fig. 1, and would like to have you inform me how the bourette or bunchy yarn is made which is used for the filling. And how the thick and thin places are produced in weaving. Trenton (2168).

We referred this question to our French correspondent who replies as follows:

FIG 1

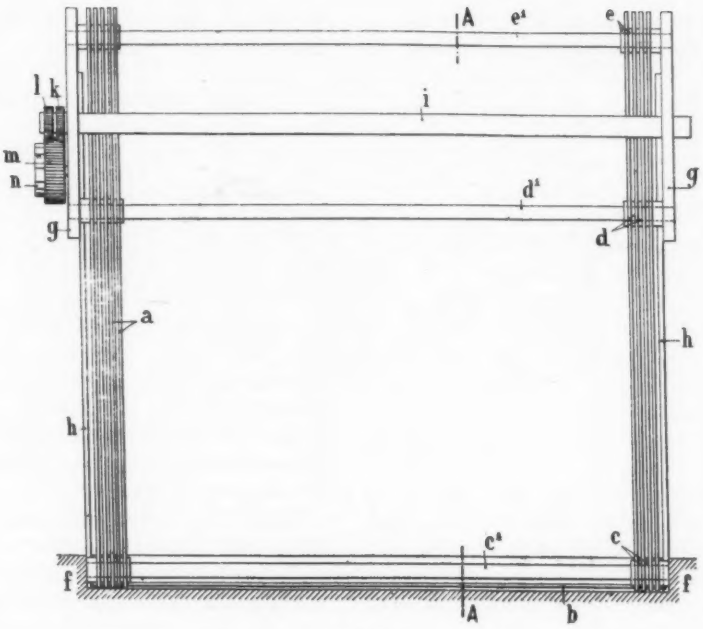


FIG. 2

In France the word "bourette" is used to designate yarn spun from waste silk. The sample accompanying the question is made of cotton and printed in four colors. The warp is made of very unfirm yarn. The filling yarn has bunches at irregular intervals. These bunches are made during the spinning process on either a mule or ring frame, by raising the upper roll of the delivery rolls at intervals. The wavy effect produced by thick and thin places in the weave is obtained by using a reed invented in France by E. Bourlet, French patent No. 355,806, July 1, 1905. This reed has movable wires which can be adjusted to different positions relative to each other.

Fig. 2 is an elevation of this reed; Fig. 3 is a plan view; Fig. 4 a sectional view along

the line a—a, Fig. 2. The wires, a, swing on an axis, v, at the bottom. The plates, c, d and e, serve to keep the wires at the same distance apart. These plates are supported by the reeds, c', d' and e'. The lower rods, c', are fixed in the lay of the loom. The upper rods, d' and e', are fastened on the plate, g, which are supported on the upright, h, which is fastened to the lay of the loom. The wires of the reed can be adjusted

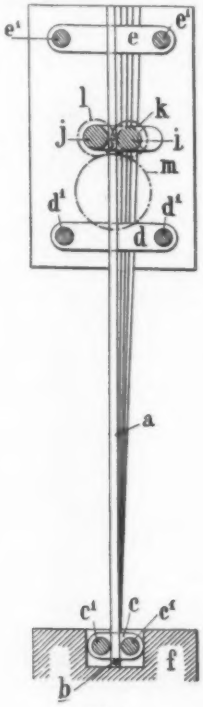


FIG. 4

at different angles to each other. They are held in position by two shafts, i and j, which are bent to produce the pattern desired, being supported at each end by the plate, g. Each of these bent shafts, i and j, carry at one end a pinion gear, k l, which is connected with the gear, m, to which is attached a ratchet, n. At each pick of the loom the ratchet is moved one tooth by means of a dog fastened to the loom frame. The bent

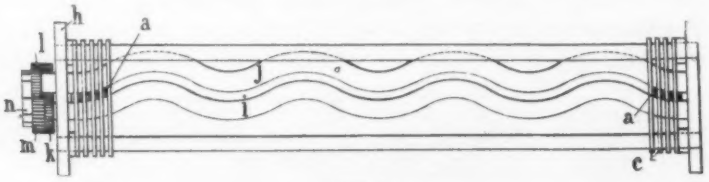


FIG. 3

shaft, i and j, thus receives a rotary movement at each pick and in turn moves the reed wires, a, back and forth. This causes thick and thin places in the cloth corresponding to the changing position of the reed wires. An unlimited variety of weave effects can be obtained by changing the form of the shafts, i and j. The twisted shaft can be replaced by a straight shaft on which are mounted eccentrics that move the wires back and forth. Gaul.

THE FINISHING OF HAIRCLOTH

Editor Textile World Record:

I am sending a small piece of haircloth. Can you tell me how I can overcome the spots that the cloth takes from the first can on the finishing machine? Deansgate (2172).

The trouble in this case is with the starch. With so heavy a mixing it is pretty sure to pick off on the cans when it gets set and hard in the hair-cloth because it is only superficially held. The way out of the difficulty is to replace the farina by a starch soluble in water which will give as stiff a finish and will not pick off on the cans. There are several water soluble starches on the market, or the farina can be rendered soluble by adding a diastase to the mixing. Many malt extract makers are now selling these preparations and they are very useful in finishing. The special malt extracts are of about the same strength and the way to prepare a solubilized starch is as follows: Mix the 12 pounds of farina with two gallons and a half of water and stir to a paste without lumps. Fill the boiler with the rest of the water which must be quite free from alkali, and turn on the steam. Raise the

temperature gradually and keep stirring. At about 150° F. add four ounces of some diastase extract. There are several good extracts known to the writer. Stir gently until the starch seems to be liquefying, then bring to the boil. This stops the diastatic action. The other ingredients of the mixing can be added as usual. Part of the dextrine might be left out if more potato starch was prepared in this way.

Culebra.

The fault described by "Deansgate" and shown by the sample submitted is due to the adhering of portions of the finishing paste to the cans of the finishing machine. From the appearance of the sample I am somewhat inclined to believe that these spots of paste stick to the cans on account of slight imperfections on the surface of the metal, a condition which may be brought about by rust spots or imperfect cleaning of the cans between the different runs of material. To obviate this trouble the cans should be well scoured with a solution of soap and then rubbed dry. Polish so far as possible where any rust spots are noticeable.

The addition of a small quantity of oleine oil to the finishing compound will also aid in preventing the paste from sticking to the cans, forming the little lumps or specks which eventually get on the cloth. I would suggest the use of one pint of oleine oil to be mixed in with the rest of the finishing materials named in the formula.

J. Merritt Matthews.

These specks consist of matted masses of cotton fibers and of the finishing paste. Their presence is due to a defective arrangement of the finishing machine. From the fact that two or three pieces from the roll pass over the first can and are properly finished shows conclusively that loose cotton fibers gradually accumulate until lumps form of sufficient size to become detached, when they are carried along with the goods.

It is difficult to point out exactly where the trouble first occurs, although it is probably not on the cans, but in or near the sizing apparatus. The formula of the size is very good for the purpose and has no connection with the trouble. Berwick.

THE PRINTING OF COTTON PLUSH

Editor Textile World Record:

Enclosed is a sample of printed plush. Please inform us how such goods are printed and finished. Mercer (2177).

This question was referred to our French correspondent, who replies as follows:

The sample submitted is a cotton plush, woven double with the pieces superimposed. An examination of the sample shows that the white pattern has been obtained by stripping the color from the black ground. The cloth was first colored black, a shade that could be easily stripped, the diamine colors being easily recognized. The cloth is then printed with a stripping solution, hydrosulphite of soda for example, to produce the white pattern. The deep colors are obtained with the diamine dyes, either by diazotizing and developing or by topping. These shades, because of their fastness to washing, do not run when being stripped, consequently they enable a clean, sharp design to be obtained. The oxydiamine blacks, N, Sooo, B, BZ and BM can also be used. After developing or topping the plush is rinsed in cold water and then dried.

The stripping solutions are prepared as follows:

1 part hyraldite CW Extra (Lyonnaise).
1 part water.
2 parts thickening material (starch, tragacanth or British gum).

Hyraldite is a stable compound of hydrosulphite of soda and similar to the hydrosulphite N F W. This mixture is heated to 160° F. for 1/4 of an hour and then after cooling is filtered through a fine sieve. The printing is done with plates or rollers. In the latter case it is necessary that the design should be cut very deep on account of the projecting pile. After printing the cloth is dried, then steamed by one run of two or three minutes in a Mather-Platt machine. To get good results it is necessary to steam with the vapor as hot and dry as possible. The interior temperature of the Mather-Platt kier should be at least 212° to 215° F. To obtain this temperature the openings at the entrance and exit of the machine are made as small as possible. After steaming the plush is rinsed and then finished. Gaul.

DYEING DUCK

Editor Textile World Record:

Please give me a practical formula for dyeing duck with cutch extract. I want a deep brown shade that is fast to light. Also give me a formula for dyeing duck with cutch bought in powdered form. Is there any danger of mildew spores from powdered cutch damaging other fabrics in the dye house?

Is there any finishing works in the United States using the genuine khaki process as is used in England? I am informed that the khaki used by the U. S. Army must be imported as there are no works finishing in this country.

Atlantic (2104).

The following is the method for dyeing browns on cotton fabrics with cutch and bichromate of potash. While it is quite old, yet the method has certain good qualities, especially cheapness, that commend it for many uses. The duck is batched up on a jig, and given two or more runs through a boiling bath containing soda ash to wet out the goods, and then they are given a good washing to remove the last traces of soda, so as to prevent the possibility of uneven shades, as soda and cutch (or any other tannin) should not be present together.

The bath is made up with 15 to 20 per cent. of mat cutch, which has been first dissolved in a stock tank. The cloth is given several passages, usually four, half the dye being used at the commencement of the first run, and the other half at the commencement of the second run. After these runs, pass the duck through a hot bath containing from 1 to 2 per cent. of bichrome, according to the depth of shade, and give two runs, after which wash well. Of course, for very heavy ducks, the number of runs may have to be increased, and it may be necessary to equip the jig with a heavy set of squeeze rollers so as to ensure penetration. The exact shade desired will regulate the number of runs, and the exact strength of the cutch bath to use.

The above formula is based upon the use of mat cutch, but as I do not know the relative strength or tinctorial value of the powdered cotch, a correct formula for the latter will have to be based upon a comparative dye-trial made in the laboratory.

Regarding the possibility of mildew, there is always a risk when the natural dyewoods are used, as, by their very origin, mould growths are always present, and spores are likely to be found floating in the air of the dye house or the finishing room. If the cutch, whether powdered or not, is dissolved in a separate corner of the dye house and in a stock tank as suggested, mildew spots are not likely to be a source of trouble.

It is believed that cotton duck, dyed by the iron and chrome process, the genuine khaki dyeing method, is carried out in this country. Inquiry of the Quartermaster General in Washington, will secure the desired information on this point.

Beta-Naphthol.

SHRINKAGE IN DYEING AND BLEACHING COTTON AND WORSTED YARNS

Editor Textile World Record:

Can you give me some information as to what the actual results have been in loss of weight in dyeing and bleaching cotton and worsted yarns? Should there, if the proper dyeing process is used, be any loss in the weight of cotton?

Champlain (2155).

In the ordinary process of bleaching when the yarns are put up in five-pound bundles, it is the custom to allow a surplus of from 8 to 28 per cent. overweight, each per cent. being called a "point." This is the weight I used to allow in our method of bleaching, and this rule was arrived at after years of experience. Of course, the quality of the stock, kind of yarn, color to be dyed, and the amount of handling the goods have to be put through in the process have to be taken into consideration. A short staple stock yarn will show a greater percentage of loss than a long staple yarn; a fine twisted yarn will not show the same loss as a coarse yarn. The reason for this is that a fine twisted yarn has more turns to the inch than a coarse yarn, the fiber being held more firmly in place and there is less waste in the process. The same is true of yarn to be dyed. If the goods are to be dyed a light shade they require more bleaching, thus resulting in more loss than would be the case in a yarn requiring a dark shade. Some of your readers may say, Yes, but what about the weight of the dye that is put in the bath? Very little weight is imparted to the goods from the passage through the dye bath. If the yarns are not handled very carefully in the process a considerable difference will be

found between the goods being handled roughly and carefully.

Most modern plants are equipped with apparatus for determining the loss during bleaching, the loss or gain in dyeing, the breaking strength in the grey, and the breaking strength of the yarn after dyeing and bleaching. I was employed in a plant where we had to check each batch that went through, not all the batch, but select at random one bundle and test it. If there was too much variation from the last test of the same kind and quality we would test another bundle to see if the variation was the same. A few tests that I made were as follows: In some bundles of 2 ply 8s, 12s and 16s we found a loss of from 7 to 15 points (7 to 15 per cent.). Some even lost as much as 23 points. Occasionally we would find a bundle that would be a little heavy. Upon opening it we generally found it to contain too much moisture. When thoroughly dried out it would show the usual percentage of loss.

On the finer qualities tested, made from long staple cotton, 35s to 50s yarns, we did not get the same variation, nor did they show the same amount of loss as the lower qualities. They rarely exceeded a loss of 12 points, varying from 2 to 7 points. I would suggest the weighing of say two bundles in the grey, tag them and after going through the process, examine them to determine the exact percentage of loss. Alpha.

BLEACHING TEXTILOSE

Editor Textile World Record:

In your issue of February I read with interest the article on textilose in which you state that this material can be bleached. The writer being somewhat interested in this work made several experiments that met with no success in bleaching the same. Kindly advise me if it is possible to bleach this fabric with chlorine or any other agent successfully and economically.

Hartford (2176).

Our French correspondent replies to this question as follows:

Chlorine gas bleaches textilose rapidly, but has a tendency to disintegrate the paper part of the thread. Chloride of lime can also be used, a small quantity of sulphuric or muriatic acid being added to liberate the hypochlorous acid. The process is repeated if found necessary. Hypochlorite of sodium or peroxide of sodium are also used to bleach this material. Gaul.

COMPARATIVE FASTNESS OF DYEING WOOL AND COTTON

Editor Textile World Record:

I would like to have your opinion as to the comparative fastness of black and other colors on cotton and wool. I have been informed that it is not possible to get a color on cotton as fast to light as on wool. Canton (2189).

The idea that a color on cotton cannot be as fast to light as when dyed on wool would seem to arise from the fact that the cotton fiber has much less affinity for coloring matter than the wool fiber. In cotton dyeing fastness to washing in the majority of cases is at least as important as fastness to light. It seems to be agreed upon that indigo is not as fast on cotton as on wool, but what red on wool is as fast as Turkey red on cotton? Knecht, Rawson and Loewenthal in their "Manual of Dyeing," classify dyes in four degrees of fastness: Fast, fairly fast, moderately fast, and not fast. They instance as fast, three wool dyes only, indigo (on wool), Anthracene Brown and Tartrazine, but Several cotton dyes, Turkey red, aniline black, the sulphide blacks and Indanthrene. Cotton, therefore, has the vote from this point of view. As a matter of fact the sulphide blacks may be looked upon as having extraordinary all round properties of fastness, with, of course, the exception of resistance to chlorine, and are at least as fast to light as a woaded logwood black. The practical question seems to be whether the wool and cotton in unions can be dyed with colors of a good and equal fastness to light. There does not seem to be much difficulty in this respect, especially with the blacks and navy blues. It is not uncommon to see an old suit in which the woolen or worsted has turned rusty, while the cotton shows little alteration. If the question was which fiber could be dyed with the most fugitive colors, there is little doubt about it. Some of the direct cotton colors and basics will show a change in a few hours of direct sunlight and vanish in a week or two of exposure. It would be impossible to free wool wholly of its color by exposure to the sun, however dyed. Culebra.

Knitting Department

KNIT GOODS SITUATION

The situation in the knit underwear end is not very much changed from what it was last month. Those manufacturers who make light weights only have all they can do to turn out goods for immediate delivery as fast as wanted. Many of them have been refusing orders for several weeks. Those who run on heavy weights only, claim to have sufficient orders to run them well into the month of October and are looking for enough duplicates to carry them well on through the year. Those who are making both weights are in a position where they must refuse orders for the lighter fabrics in order to get the balance of the machinery turned over to the heavier weights so as to be able to make deliveries.

Quite a number of buyers have been in the market during the past month, some to size up the spring situation, others to hasten along deliveries for the present season and to pick up any stock lots, which so far as we can learn have been very scarce all the season. From the buyers who were on during the month of May, there is gathered the general information that all business placed by retailers west of Chicago has been very good. From those whose territories lie east of Chicago comes the report that so far their fall business has been considerably lighter than usual. Possibly the number of orders is about as usual, but the quantities seem to be very much smaller.

It is believed that stocks of light weight underwear in the hands of jobbers and retailers are light and that the season will close with the buyers in a position to place larger orders than ever before.

Prices on fall lines have remained firm generally, although we have heard of some instances where buyers might have procured recently, men's ribbed shirts and drawers at $3.25, $3.37 1/2 and $3.50 for ten, eleven and twelve pound weights.

Men's fleeces are still at high levels. The low grades that were sold early in the year at $3.25 are priced now at $3.45. It is said that many of the smaller buyers are placing orders on this basis quite regularly for late delivery.

The thoughts of all are materially turning to the spring lines. While we have had an opportunity of seeing only a few numbers as yet, enough has been done to indicate that many lines will be opened on the basis of last year's early prices.

Combination suits continue to occupy the center of the stage in the knit underwear game and their popularity is increasing every day. The call is almost entirely for plain stitches in the ladies' goods. These are being shown at $1.90 and up. They are trimmed with torchon lace to make extremely attractive garments for the consumer to buy at 25 cents. At $3.25 to $3.50, combed yarns with better laces are being used. At these prices, many lines of so-called three piece combinations are being offered, and the trade is taking the goods very freely.

Fine lisles and mercerized fabrics are being shown in lines from $6.00 to $7.00. Such perfection has been reached at this range of prices that it practically marks the limit at which any large volume of business on ladies' suits is being done.

The Canasawacta Knitting Co. are offering their line of men's suits at last year's price, namely, $3.50 and they have added to their range a line of combed yarn suits at $5.00, as well as a line of lisle suits at $7.00. These are all made with tailored shoulders and with cuffs and ankles.

The business on "Cumfy Cut" vests and suits has been particularly good during the season just past. One Pennsylvania manufacturer is preparing to put on the market a garment of similar design, but the claim is made that it is not an infringement, owing to the fact that the tape is fastened to the edging for a few inches across the back.

There have been some attempts made to delay the opening date for spring lines until after July 4th, but as usual, there are a few manufacturers who will not line up to such a proposition. As a result, there will be no general opening date and probably by the time this issue is in the hands of the reader, many lines will be on the road.

HOSIERY

"Between hay and grass" is the expression used by a manufacturer's agent to define the situation in the hosiery end at the present writing. Manufacturers of all lines have plenty of orders and are from two to three months late on their deliveries. Numerous causes are mentioned to account for this condition. Among these might be mentioned the high cotton and yarn costs, lack of sufficient help, shorter hours of labor, congested condition of dye plants and bleach houses. In addition to these comes the proposed change of tariff, which it is claimed by many, will have its effect on all grades of hosiery, by first affecting the fashioned goods which will in turn have its bearing on fine gauge seamless goods and from that on to the cheaper qualities.

According to some manufacturers who have been recently interviewed, the prices at which many lines will be opened will be those quoted during the past five to six months. These rule slightly higher than those at which the lines were opened last July.

Manufacturers of seamless lines will be ready at about the usual time, but the full fashioned lines will probably not be shown until after the Tariff bill is passed. It is said that some German manufacturers have already revised their prices upward to such an extent as to cover the difference between the existing and the proposed tariff rates.

Chemnitz reports that large shipments are being made to the United States every week and manufacturers over there are supplied with orders to cover production for several months to come. Selling agents for German manufacturers are not taking any orders or quoting any prices for next spring, and declare they will not attempt to anticipate the action of Congress, but will wait until final settlement.

The demand for fiber silk plated stockings and half hose exceed the supply on many lines. One of the newest numbers being shown is a ladies' stocking at $1.90 made of tram silk, but plated wth fiber silk which makes a beautiful appearing stocking and light in weight for summer wear. This is made with high spliced heel and double sole, and promises to be one of the big selling lines for the coming season.

The tendency is apparent toward slightly heavier weights in all grades of women's hose and there is not the demand for extremely light weights that there was a year or two ago.

MILL EXPERIENCES

Under this head we will publish from time to time stories from practical mill men, telling of vexatious and unusual difficulties which have occurred in different branches of mill work, and how they have overcome them. We invite mill men to send us an account of such experiences. We pay, of course, for all that we use. Facts told just as you would tell the story to a friend are what we want, not fancy writing.

KNITTING MEMOIRS

BY CYMBAL

A hurried call for a boss knitter had come from a town in Georgia. We knew of none

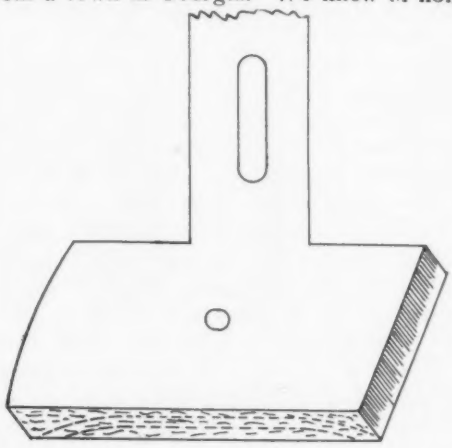


FIG 4

just then. As I was not doing much my boss made arrangements for me to go down

and help them out. I arrived in the town about the middle of January, on a fine spring-like day, a marked contrast to old Philadelphia hugging zero. The owners, two gentlemen of the old fashioned Southern type, took me around the mill. The frames were at least ten years old and no care had been taken of them for no knitter would take

FIG. 2

interest enough in the town or his job to stay over a year. The frames had gradually run down and local talent had put the finishing touches to them. There were about 25 latch needle frames running on a cheap shaped garment. There were all kinds of stitches, lengths and holes in most of them. The few frames that were able to run were making seconds.

The owners wanted a size six garment started first to get an order out. I cannot tell all that was the trouble with the frames. There was not a place where you could not see trouble in bunches. The dials had been set too low and the waste fingers were out of order, so the waste had naturally loaded up on the needles as high as the guide stands. There might have been a few good needles in the frame, but I doubt it. The only thing to do was to take the frame down and after cleaning, build up again, meanwhile looking over the parts.

After looking over the cams carefully, I found they were all in need of grinding. It took about a day to grind and smooth the top and bottom sets of cams, but they looked good when they were ground. After cleaning the dial and cylinder and trying the needles in each slot I began to put the frame together. There were no old needles to use, so I was sure of the needles being all right. I had trued the dial and run the frame a few minutes to see if the cylinder needles were right and no butts broken off. There was the usual trouble in starting new needles because most of the latches were stiff. The cloth got below the cylinders. There were a few bent latches, caused by rough and cut yarn carriers. The bottoms of most of them were certainly the worst I had ever seen, see Fig. 1. After smoothing them as well as I could with the tools that were handy, I put them on and they seemed to do the work. I got the cloth below the take-up at last, but there were plenty of holes in it. I had made no changes in the stitches, but grinding the cams had perhaps made the goods look worse than ever. After trying the stitches I found no two alike, some were pulling a foot more than others. After evening the stitch the holes still came, and I began to look for the reason. I had tried everything that had occurred to me. Turning the frame slowly I happened to see a stitch break in a strange place, it pulled apart after it had been released from the stitch cam, just where the needles were idle between stitches. I had an idea that the yarn had broken at the stitch and had pulled apart after leaving. Still that was hardly possible, as the stitch was long enough to ease any yarn of that size. There were several places where the holes came in a straight line. I had taken out the needles, put in new ones and even exchanged the new ones for some that had been run for some time. Still the holes came.

I had about a dozen needles out and stood looking at them when I noticed the top of the cylinder was cut. It had always been my habit to look after this wearing when I had a frame apart, but this time I had forgotten to do it and the neglect had cost me a lot of valuable time. The cylinder and dial had been worn until it looked like the teeth in a saw, Fig. 2. I then had to take the frame down and smooth the dial and cylinder on a lathe, using a smoothing file. There were

places in the cylinder where the needle had worn through at the top and left a cut at least 1/32 inch deep. I put the frame together again, making the necessary adjustments to the stitches to allow for what I had filed off the cylinder, and started it going. The cloth came down perfect. The first garment down, I cut it off and measured it. It was about 23 inches long and too heavy. It was a size six and had to be at least 34 inches long. I kept taking out links and lengthening the stitch until I got the right length and weight.

I then started on another frame, but it was out of business. I looked at the cloth and found holes, drop stitches and the fabric so uneven that the high spots could be felt. There was weight enough on the take-up to tear the stitches off the needles. I had intended to run this frame without taking it down, if possible. That was out of the question, as I could hardly turn it around. It was in such bad shape that I had to take it apart. I found just what I expected, dirt packed hard in all the slots; the soft yarn guides needed grinding, and the nicks and low spots had to be ground from the cams. This dial and cylinder were not as bad as the other one, but I smoothed it up on general principles, as it would not be many weeks before it had to be done anyway. It was a case of hustle just then so I had a helper grind the yarn guides and scrape all the wearing parts, while I used a lathe on the dial and cylinder. Even after the frame was ready to run it took all day to put the finishing touches to it, for the stop motion had to be patched up and set, leather put on the brake, the take-up had to be taken apart and scraped clean. The oil holes were plugged up, and the bearings rusty. When ready to start I gave that frame a bath of oil, the first it had had in years. It started off well and ran steady.

I knew what to expect now so I took all the frames down as I came to them and gradually got them going. One or sometimes both of the proprietors stood around and watched me. I used to explain to them how a mill was run in the North and how to get the work out of the help, but they never changed the tone of apology when giving orders to the help or their habit of overlooking anything the girls did.

I had worked until noon one Sunday to get the last frame ready to run and had gone out and was sitting on some cases in the back of the mill. The grass and flowers looked fresh and bright. This was surprising for a day in February. There was nothing in the town to amuse one or occupy an idle hour, nothing to do but sleep, eat and work. I had been there a month but it seemed like a year and I sat thinking of what the boys were doing in Philadelphia, Utica or most any other city in the North where life was worth the living. I left the next day with orders to stop at Norfolk.

A KNIT NECKTIE

The illustrations show a knit necktie recently patented in this country and which is described by the inventor as follows: The object of the new construction being to provide a necktie knitted with a narrow neck

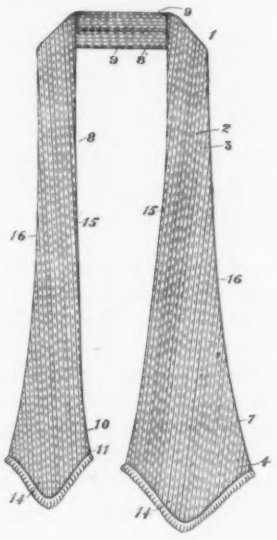


FIG. 1

portion merging into a flaring or gradually widening end. A narrow neck portion merges into a flaring end, each terminating in a shaped end. The necktie may be knit with longitudinal ribs so as to produce an accordion effect. Fig. 1 is a plan view of the necktie; Fig. 2 is a rear view of the larger

flaring end. The necktie is given in iridescent effect lengthwise by using different colored threads; for example, a black and red, or other combination, the colors forming alternate colored rows, 2 and 3 extending lengthways of the tie.

The tie is started with a certain width in the machine, say at the end, 4, and by gradually throwing out of operation certain needles or stitches on one side, it is knit with one edge, as 5, straight and the other, as 6, tapered, Fig. 2, so as to have a tapered or

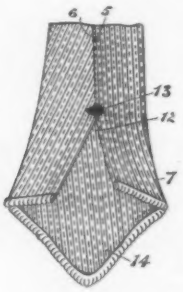


FIG. 2

gradually widened end when the tie is properly made, as at 7. This taper continues until the neckband portion, 8, is reached, both edges, 9, of which are knit straight. When the tie is started at the widest portion of the end, 4, certain needles are gradually thrown out of operation on one side, for example, the side, 6, this resulting in a gradually widened end. The other side remains straight until the neckband is reached, when both sides are so knit that the edges will be substantially parallel. To form the other gradually widened end, 10, needles on one side are gradually thrown into operation. In this way the taper is gradually obtained until the wide portion of the tie is completed. The tie is then formed up so that one straight edge and an inclined edge, 5 and 6, will be brought together, and sewed along the edges. Where the straight edge and the flaring edge separate, as at 12, they are barred, as at 13, as shown in Fig. 2. Before the sewing, each end of the tie is cut and overedged to give the triangular shape, 14. This overedging may be done with different colored threads corresponding with the body of the tie. When the tie is made up, one edge, 15, will be straight, while the opposite edge, 16, will be of tapered form.

Each end of the tie is of triangular form and of a single thickness of material. This improved flaring tie is knit in the desired shape as distinguished from being cut from a knitted blank. When of an iridescent or accordian appearance it is preferably knit with longitudinal ribs and horizontal courses, and with the face of the tie of contrasting colors. The rear of the fabric is usually of a solid color, making a tie that can be reversed if desired.

THE MARKET IN GERMANY FOR AMERICAN HOSIERY

From THOMAS H. NORTON, American Consul, Chemnitz

It seems like conveying coals to Newcastle, to attempt to introduce American knit goods into Germany, and yet shipments of American silk seamless hosiery, to the German market, in steadily increasing amounts, are now a matter of daily occurrence. The proportions of the trade are assuming such size, that the hosiery manufacturers of Chemnitz are beginning to feel some apprehension as to the possible entry of the world's market, at no remote date, by American manufacturers.

The essential facts in connection with this appearance of American hosiery in the country, which has hitherto been the chief source of supply for a number of European markets, and for most non-European countries, with the exception of the United States, are worthy of note as illustrating possibilities along other lines of manufacture. One noteworthy feature in the movement has been the widespread effort to dispose of American hosiery in direct connection with the sale of American shoes. One enterprising American hosiery firm has made a pronounced success in this direction, and its stockings and socks of good quality and at popular prices, have regularly been offered for sale, along with American footwear, in all leading German cities. The prices and quality have created a distinct demand, and German dealers have turned to American sources to secure the requisite supply. As most of the hosiery required in Germany is supplied by Chemnitz manufacturers and jobbers, inquiries

have come to this city, in an increasing ratio, as to whether American makes could be secured. Thus far the demand has been exclusively for seamless silk hosiery, or silk-plated hosiery, of American make.

One leading firm, in Chemnitz, engaged in the manufacture of full-fashioned hosiery, has for two years imported considerable amounts of American seamless silk hosiery, and disposed of the wares at very remunerative prices. At the beginning of 1913, when seeking to place a large order with the American mill which had hitherto furnished the supply, information was received that its entire output for 1913 was already sold in advance. This firm would gladly enter into relations with other American mills, capable of supplying its needs. (Address: care of American Consulate, Chemnitz.)

This firm has hitherto dealt chiefly in seamless socks, which sell regularly in American stores for 25 and 50 cents per pair. The cheaper grade is made of artificial silk, and retails in Germany at M. 1.50 ($0.357), per pair. The more expensive quality is of pure silk, and is sold here, at retail, for M. 2.00 ($0.476), per pair.

Another manufacturer in Chemnitz, who makes exclusively seamless hosiery, and is in close business relations with an extensive circle of German department stores and retailers, informs me that the demand for American seamless hosiery is so marked among his customers, that he is exceedingly desirous of securing the output of one or more American mills. The machines in his mills, and in the establishments of other similar Chemnitz hosiery firms, are equipped for the knitting of coarser grades of yarn. In American mills, the mechanical equipment for the production of hosiery knit from the finer numbers has been vastly augmented of recent years. As the German demand for these finer grades of work has suddenly developed, and assumed relatively large dimensions, the domestic manufacturers are totally unable to manufacture the class of wares now wanted. There is, of course, a certain hesitation to make large increases in plant, for what may prove to be a merely temporary fashion.

Attempts have been made to introduce American seamless cotton hosiery, but thus far without success. The German makers seem able to meet the competition easily.

The bulk of the imports of American seamless silk hosiery goes to jobbing houses in Berlin or Hamburg, and is distributed from those points to the retail trade. Importations through Chemnitz firms are, thus far, of much less importance. The Chemnitz manufacturers are, however, realizing the desirability of carrying the American wares in stock, in order to meet the demands of customers, and utilize existing relations with them.

At present, much of the current volume of the import of American seamless silk hosiery into Germany, is due to the quick-witted recognition by German dealers and manufacturers that there is an excellent opportunity for making good profits in handling the article, and the remainder is the result of a very well-organized campaign by a single American firm.

The cost of raw materials is the same in both countries, and the factor of wages enters relatively less into the cost of seamless hose, so that differences in wage rates do not count for as much, as in the case of full-fashioned wares.

[Samples of natural silk and artificial silk hose made in the United States and sold in Germany accompanied the above report and can be seen at our Boston office.]

SIZES OF BATHING SUITS

Editor Textile World Record:

Will you kindly send us dimensions for scale of sizes 34 to 46 for men's sweater rib bathing suits made on circular machines, the scale to include the proper measurements for each garment, namely, shirt and pants. Canada (2193).

I really do not know how to answer this inquiry as the measurement of bathing suits is very difficult to describe. In the first place there are different sizes given for each fabric according to the elasticity of the cloth. Some cloths are more elastic than others and have to be cut accordingly; some cloths are wider than others and must be cut accordingly. Some goods shrink while on the machine and others shrink while off the machine. It would be almost an impossibility to give a table of the sizes of these goods. Furthermore the sizes will depend upon the name of the machine that "Canada" wishes to use. Ironstone.

FOUR-THREAD LACE BRAID

BY RUTHVEN

The fancy lace braid shown at Fig. 1 is made on what is called a four-thread lace braiding machine. It is one of the many designs of this grade of lace made from ar-

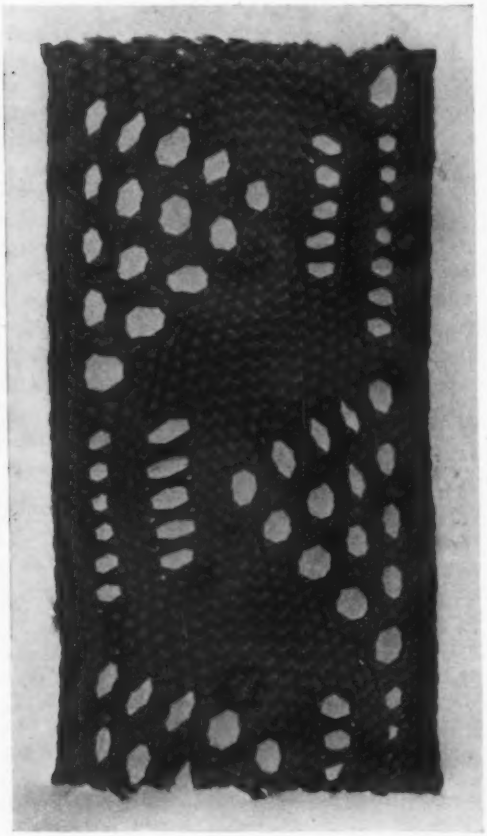


FIG. 1

tificial wood silk and is used extensively as a dress trimming on all high grade dresses, suits and cloaks. This machine is considered the most difficult to operate of any of the braiding machines, differing entirely from the general line, and has many complicated parts not found in other machines. These include the jacquard and crown beaters, the former making the design and the latter holding the same without the support of any other material but that which is used throughout the pattern.

In the majority of laces where jacquards are used, the design shown on the draft paper would be thrown forward on the material and would be readily distinguished, and it would require a background of some kind to show the design. By comparing the design shown at Fig. 2, it will readily be seen that the corresponding design at Fig. 1 is but a series of holes of the cheapest kind of material used in manufacturing braids, namely air, and it is for this reason, saving material, that the four thread lace machine

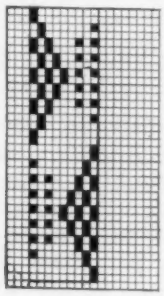


FIG. 2

is considered a very valuable member of the braiding machine family.

The jacquard used on this machine is similar to that used on the radium lace machine, described in a recent issue, but is connected in the four-thread machine that where the holes punched in the cards in the other machines open the switches, in this machine it closes them, making the holes shown at Fig. 1. There are twelve sections or plates around which four spindles, carrying twelve ends of 150 denier artificial silk, continually revolve, according to the holes punched in the design. Two ends of 2/20s mercerized yarn on the edges make a firmer sewing edge. By using blank cards on the jacquard frame, which would allow the switches to remain stationary, a 12, 11, 10, 9, 8, 7, 6, 5, 4, 3 or 2 line plain flat braid can be made. These machines also have what are called crown beaters, whose function, as the name implies, is to beat the ends of the materials close together, without having them overlap each other or show ragged edges, at the same time beating them into their proper positions in the pattern.

The crown beater derives its name from the fact that it is shaped like an inverted crown. It is placed in the center of the machine on what is called the truss or supporting bar, directly above the formers, a device for regulating the width of the braids. The crown beater is really a series of 12 smaller beaters arranged in a circle so as to have 6 beaters working alternately, that is, 6 working against the materials while the other 6 are working out. This action allows an even tension on the materials being braided at all times. It receives its motion from a vertical shaft situated at the rear of the machine, having a gear connected to a counter gear on a counter shaft, to which a cam is fastened. Every revolution of the cam moves a quadrant causing the 12 smaller quadrants holding the 12 beaters to perform the motions required.

A MACHINE FOR UNITING KNIT FABRICS

The illustrations show parts of a machine recently patented in this country for uniting knit fabrics by means of an elastic seam or chain of stitches. It is designed for closing the usual opening in the toe portion of the knitted stocking, and to form an elastic chain of stitches for joining the adjacent loops of the two portions of the fabric to be united, this seam being formed transversely in the toe portion of the stocking and adapted to cooperate with the loops of the stocking fabric to provide traverse elasticity. To provide the necessary or required elasticity in the uniting seam or chain of stitches, a stitch finger is mounted above and extends in the direction of the travel of the ring of pins in cooperative relation with the thread needle and thread carrying looper in the stitch forming operation, this stitch finger being adapted to be included in a chain of uniformly formed stitches, thus providing the necessary or desired elasticity in the latter as withdrawn or shed off by the united loops upon the subjacent pins. The mechanism for operating the thread-carrying looper is operated directly from the thread needle arm and mounted on the dial support opposite the feed side of the sewing mechanism, thus affording free access to the latter as in threading the needle and looper. The looper operating mechanism is adapted to work at right angles to the movement of the thread needle.

A further object of the invention is to provide improved and simplified mechanism for operating the thread needle arm as well as moving the thread needle arm and thread needle laterally to correspond with the movement of the subjacent pin while the curved

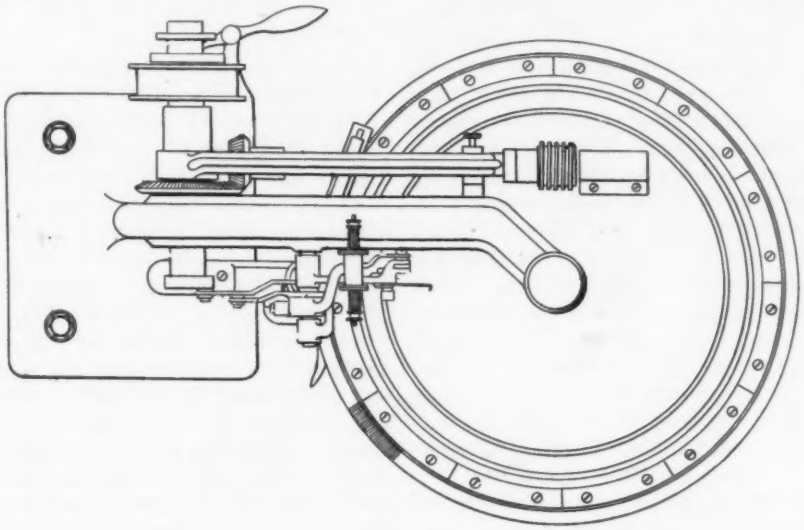


FIG. 1

thread needle is in the loops. Another object is to provide an improved feed roll immediately beneath the paths of travel of the reciprocity thread needle and looper and the cooperating stitch finger whereby the loops of fabric to be united are held and maintained in position during the sewing operation. Fig. 1 is a top plan of the machine; Fig. 2, a side view. The machine comprises a stationary bed plate provided with an upwardly and outwardly projecting supporting arm. The arm terminates in a bearing head carrying a vertical shaft and a stationary supporting disk or dial plate. The dial plate

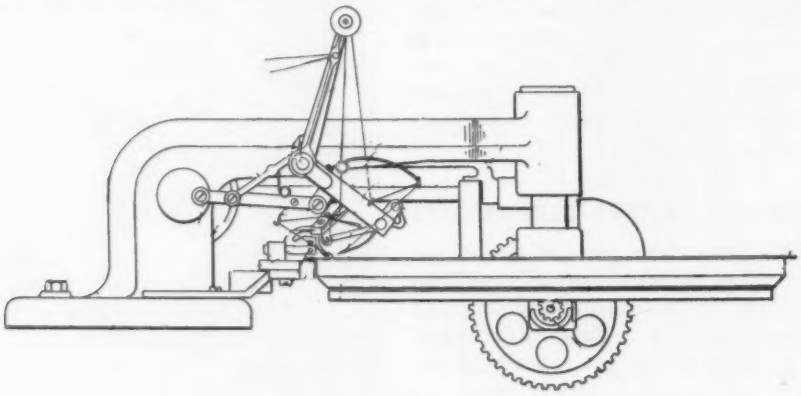


FIG. 2

may be provided with the usual ring carrying a series of outwardly extending pins. The loops of the fabric to be united are placed over the impaling-pins. The ring is driven by a shaft mounted in an arm and receiving its motion from a gear on the main shaft.

As the needle arm and curved thread needle are moved rearwardly, the bearing heads of the needle arm will be returned to their former position as the bearing head is returned to its initial position. By reason of this movement it is obvious that as the needle arm is reciprocated it will be moved laterally in its to and fro movements and thus carry the thread needle laterally while in the loops of fabric to correspond with the movement of the impaling-pins carried by the continuously rotating ring.

As a means for actuating the looper and looper carrying arm by and in unison with the needle arm, the latter is connected to the free end of the looper carrying arm by means of a connecting link member, the opposite end of the link member being connected to a depending bearing block carried by the looper arm, the connection between the link member and the needle arm being made by means of a slotted head operating on a bearing bolt or pin. As a means for insuring the proper actuation of the slotted head with respect to the needle arm when the latter is at or near its rearward or most retracted position, the looper carrying arm may be provided with a wiper spring adapted to engage with the connecting link member at a proper time during the reciprocatory movements of the parts. To give the looper carrying arm the proper compound or combined longitudinal and undulatory movements whereby the looper is given the proper movement with respect to the reciprocatory thread needle and over and about the offset portion of the stitch finger in the stitch forming operation, a cam head is connected to the supporting bar. This bracket is provided with a cam face, adapted to bear against the bearing block for moving the looper carrying arm longitudinally. As a means for giving the free end of the looper arm an oscillating movement, the cam head is provided with a guide slot to receive a guide pin extending from the bearing block. As a further means of holding and guiding the parts in proper position, the looper carrying arm may be provided with a depending guide pin extending into and adapted to travel within

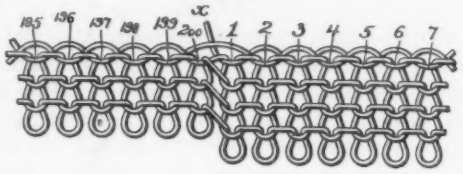
a curved guide slot at the end of the supporting lever. To assist the work guide member in directing and holding the work or loops of fabric to be united in proper position upon the impaling-pins during the sewing operation, a horizontally mounted feed roll is provided. This disk or roll is adapted to bear against and travel upon the outer periphery of the ring immediately beneath the impaling-pins and the paths of travel of the reciprocatory thread needle and looper, which is held in position by means of a movable bearing operating against a spring. This spring is mounted in a guide opening in the bracket portion, the spring being removably retained by means of a threaded plug.

A SELVAGE KNITTED WEB

The accompanying illustrations, Figs. 1 and 2, shows a selvage knit fabric recently patented. Instead of starting the knitting operation by feeding the knitting yarn to the needles in succession, in the ordinary way, the knitting yarn is fed to alternate needles of the set, say the odd numbered needles and on the next course the yarn is delivered only to the even numbered needles, or to all of the needles. Thus in Fig. 1 the knitting yarn starting at x has first been drawn into a loop, 1, by the first needle, has then missed the second needle, been drawn into a loop, 3, by the third needles, has missed the fourth needle, been drawn into a loop, 5, by the fifth needle, and so on, around the series of needles, being finally drawn into a loop, 199, by the next to last needles and missing the last needle. On the next course, however, it misses the first needle, is drawn into a loop, 2, by the second needle, misses the third needle, is drawn into a loop, 4, by the fourth needle, misses the fifth needle, and so on, finally missing the next to the last needle and being drawn into a loop, 200, by the last needle. Each needle now has a loop and in knitting the third course, stitches are drawn through all these loops, and so on, the result being a close, non-raveling selvage at the top of the web.

In the modification shown in Fig. 2, the yarn is first drawn into loops by the odd numbered needles, as shown at 1, 3, 5, 7, 9, etc., and misses the even numbered needles, but in laying the second course a stitch is drawn through the loop, 1, a loop, 2, is then drawn by the second needle, a stitch is drawn

FIG. 1



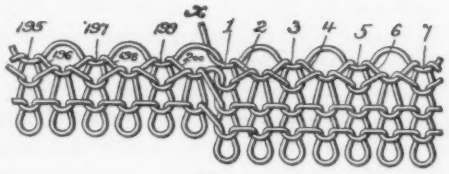


FIG. 2

through the loop, 3, a loop, 4, is then drawn by the fourth needle, and so on, throughout the series, a stitch being drawn through loop, 199, a loop, 200, being drawn by the last needle and the yarn then being drawn through the stitch upon the first needle to start the third course on the odd numbered needles, and then through the loop, 2, on the second needle to start the second course on the even numbered needles.

A selvaged web of the character described lends itself well to the production of a welt or hem upon a web by restraining the initial loops or stitches upon some of the needles until the desired length of web for the welt or hem has been knitted, and then casting off these restrained stitches into engagement with the stitches of the course which is being drawn. The stitches upon either the odd or the even numbered needles are available for such restraint.

About three thousand years before Christ the dwellers along the Nile wove linen cloth of a fineness that is still unequalled. About one Egyptian mummy was found linen cloth containing 540 warp threads to the inch, while the best woven in England up to a recent date had but 350 threads to the inch.

Dyeing, Bleaching, Finishing, Etc.

DYEING MIXTURES OF SILK, ARTIFICIAL SILK AND COTTON

BY CULEBRA

Fashion has already decreed that this coming summer is to be a season of bright colors. Reports from Paris and London talk of bright browns and blues for gentlemen's suitings and the check thread effects in cotton, mercerized cotton, artificial silk or silk will be the rule. As for the ladies, their costume cloths will emulate the scarf of Iris and the effect threads in white and colors will be made much use of. Surely these are the most allowable forms of mixture cloths and they have grown more popular both with the public and with the dyeing trade since they have been dyed in the piece. Not many years ago the thing would have been looked upon as impossible, but now any wished for effect seems to be possible in the piece dyeing of mixed fabrics.

The most difficult of problems for the dyer is to ring all possible changes on the mixtures of silk, artificial silk and cotton, now very largely used for garments, linings and fancy upholstery. It is evident that the properties of fastness required in these goods vary greatly. For example consider the different requirements in this respect of a blouse, a parasol, an umbrella and overcoat lining. The double problem is therefore before the dyer of choosing colors with the necessary properties of fastness which at the same time are capable of being used for the particular effect desired.

Half silk goods must be thoroughly clean before dyeing and for light shades it is necessary to bleach them. This can be done either with perborate or with peroxide of hydrogen of 10 to 12 per cent. This is mixed with four times its volume of cold water, heated to 120° F., and made just alkaline with ammonia. The goods are stirred about in this a few times and then left for some hours, best overnight. Peroxide of sodium can be used and the bath is then prepared by mixing 120 gals. of water with 13 lbs. of concentrated sulphuric acid, and slowly adding, preferably by sprinkling, about 10 lbs. of sodium peroxide with continual stirring. To save waste of oxygen the bath must still be acid when ready so that the reaction to litmus must be watched and the addition of peroxide stopped in time. The bath is now heated to 120° F., and made slightly alkaline with ammonia. The goods are entered and left overnight. The bleach vats must be of wood or earthenware, and the heating coils should be of lead and ought to be taken out as soon as the desired temperature is reached. To prevent uneven bleaching through rising to the surface, a wooden trellis should be floated in the vat. The bleach baths do not exhaust and can be reinforced again and again as long as they keep clean. Great care must be taken to avoid injury to the goods by heedless or unnecessary handling, and to avoid spoiling patterns by distorting the warp or filling. Even a rough place in the side of a vat may produce a mark which cannot be got rid of.

The dyeing may be done with a winch, a jigger or a padding machine. The winch, however, is suitable only for slight and medium qualities where the formation of rubbed places is not to be feared. All good qualities of fabric should be dyed full width on the jigger, but very light shades should be dyed on very delicate material by one or two ends on the padding machine. Good effects on delicate fabrics have also been obtained in the foam bath.

For dyeing fabrics of cotton and silk the direct cotton colors are chiefly used. Many of these coloring matters, given skilful use, will dye both fabrics exactly alike. In general the less alkaline the bath and the higher the temperature, the smaller is the amount of dye taken up by the silk. The silk is first brought to shade at a heat near the boil, and the cotton at 100° to 120° F. To cover the silk either basic or acid dyes may be used. The former are generally dyed in a

weak soap or acetic acid bath at 85° to 100° F. Most basic dyes, such as auramines, rhodamines, New Methylene Blue, and Crystal Violet are suitable. The cotton also takes up some of the basic dye and the colors are thus made brighter. The acid dyes are employed with about 3 per cent. of acetic acid. Examples of acid dyes which dye the silk only are Milling Yellow O, Brilliant Milling Green, Brilliant Milling Blue, Formyl Blue, Formyl Violet S 4 B and Acid Fuchsine.

It is very often necessary to dye mercerized cotton containing silk effect threads so as to leave the latter white. To do this with direct cotton colors the bath is prepared with soda ash, soap and phosphate of soda. A very large number of direct dyes are available and the color makers will always supply lists.

To improve the fastness of the direct dyes, particularly to washing and light, they may be after-treated as usual with salts of chromium and copper, or diazotized and developed. The latter method is especially resorted to for making navy blues and blacks fast to washing. The developer employed is beta-naphthol or diamine.

Aniline oxidation black is still largely used on half silks when the chief point is to check as far as possible the development of free acid which tenders the material. The use, too, of Diaminogen B, developing with diamine, lessens the cost of the dyeing process and gives a larger output of faultless goods. For the better covering of the silk in this case a suitable Naphthylamine Black is added to the bath at the outset, and driven on to the silk with acetic acid. After dyeing and developing, thorough rinsing and soaping are essential. Other substitutes for aniline black which give good results are various sulphur blacks. They are easily applied and give great fastness to light and washing without tendering the fiber. If the dyeings are aftertreated with bichromate and lactic and acetic acids they can be topped with logwood which gives a fine bloomy black.

Two-color fabrics, or shot effects can be attained in various ways. One is to dye the silk in an acid bath with an acid dye and the cotton afterwards with substantive dyes. This process is worked at as low a temperature as possible, and with increased quantities of alkaline assistants. Such direct dyes are selected as have a greater affinity for cotton than silk. The process is of course reversible, and basic dyes can also be used if particularly bright shades are wanted.

The fastness of the direct dyeings got with sulphur dyes makes this class of coloring matters very useful for our purpose, in spite of the fact that the indispensable sodium sulphide has a prejudicial action on the silk. This can, however, be minimized by several well known additions to the dye bath such as gelatine, in quantity three times as great as the dye. The dyeing takes three-quarters of an hour at 110° F. This method is a favorite one in black styles with white or colored silk effects, a style formerly produced solely by diazotizing and developing.

By after dyeing the silk very fast cotton grounds are obtained, especially in dealing with large batches. Sulphur dyes are best dyed on a jigger with wringing rolls. Medium or light goods can, however, be dyed on the winch, beginning with a short winding and finishing by total immersion. After careful wringing the goods are rinsed cold with a little soda, and finally hot soaped and brightened.

If the bath has begun to oxidize when it is reinforced, it must be reduced with a little sulphide of sodium at the boil, cooling down to 100° F. before entering the next batch.

Artificial silk is much used in these styles on account of its splendid luster, but as it is much less elastic than natural silk, and is easily torn when wet it is rarely used in the warp, being confined to the filling. Many blouses and other ladies' goods are made of mixtures of cotton and artificial silk. Artificial silk is also used for making embroidery, cravat stuffs and lace. All these goods require extreme caution in washing, so as neither to injure them nor put difficulties in the way of the dyeing, especially light shades, except that much more care is taken, the washing is done exactly as with ordi-

nary cotton fabrics. Stretching for example is of course out of the question. The baths used must be as slightly alkaline as possible and their time of action as short as possible. To preserve the luster of the artificial silk a little good rosin soap is added or a soaking oil such as Monopol oil. The washing is best done in a continuous machine with little pressure between the rollers, but winch vats can also be employed. Heavy goods are done on the jigger. Embroideries and laces are boiled under pressure with lye and rosin soap. While all goods to be dyed in light shades require a thorough treatment in the wash lye this is often omitted altogether in the case of goods to be colored dark, which go direct to the dye vat. Even for these goods, however, a short scouring is advisable, for it helps the brightness of the shades.

Dyeing is usually more difficult with fabrics composed of cotton and artificial silk than with ordinary half silk. Artificial silk, cuprate and viscose silk in particular is closely related to cotton in its chemical and tinctorial properties, but has considerably more affinity for direct dyestuffs so that care must be taken that it does not get darker than the cotton. This is the more important as to preserve the effect of the silk in the mixed fabric it should be a little lighter than the cotton. Here and in the fact that different cotton fabrics behave differently to the same dye, we have the causes of the difficulty alluded to at the beginning of this paragraph.

The over-dyeing of the silk is least to be feared provided a proper choice of a dye has been made with Chardonnet silk, which has less affinity for most substantive dyes than either cuprate or viscose silk. Viscose silk, however, is now in the ascendant and is the most useful form of artificial silk with the dyer.

The following is an account of the attempts which have been made to increase the affinity of the cotton while diminishing that of the viscose or cuprate artificial silk with which it is interwoven. Satisfactory results have been got with tannin. The goods are given a hot tannin bath for some hours, rinsed and entered into a lukewarm solution of about 2 pounds of tin salt for every 3 pounds of tannin in the first bath. A second thorough rinse follows, after which the fabric is dyed in a fresh bath with a direct cotton color at a rather higher temperature than usual. Another way is to treat the fabric for from one to two hours at 130° to 140° F. in a bath consisting of caustic soda lye. It is then rinsed, soured cold with hydrochloric acid, rinsed again, and dyed in a fresh bath with direct cotton colors.

In every case, however, the main factor in regulating the amount of dye taken up is the temperature. The lower that is the more of the dye goes on to the cotton and the hotter the bath is the more of the dye goes on to the artificial silk. If this rule is intelligently worked good results will be got in most cases with the tannin or caustic soda.

Most cotton and artificial silk mixtures are dyed on the jigger under light tension. The bath is prepared for light shades with 5 per cent. Glauber's salt crystals, 1/2 per cent. soda ash, and 2 per cent. Marseilles soap. As much as 15 per cent. Glauber's salt is used for dark shades, as it promotes exhaustion of the bath. The goods are entered at 80° F. and worked for some time at that temperature. The bath is then gradually heated first to 120°, then to 140° F., when the artificial silk begins to catch up the cotton. The bath must be kept slightly alkaline throughout, and any excess of Glauber's salt is to be avoided as it deepens the color on the silk. An addition of Monopol oil to the dye bath helps to prevent injury to the luster of the silk and brightens the color. The dyeing being done at low temperatures, more dye is required than if the bath was boiled. The bath can be kept standing as it does not nearly exhaust. If the resulting shade is not bright enough, topping with basic dyes can be resorted to. Any basis dye can be used, but the safranines, fuchsines, cerises, Brilliant Green and New Methylene Blue are particularly serviceable.

If raw cotton fabrics with artificial silk in

warp or weft have to be bleached, the usual cotton bleaching methods are adopted, but care must be taken not to tender the artificial silk. If the operations are too prolonged, this may take place from the formation of oxycellulose and cellulose hydrate. The bleaching may be done with bleaching powder, sodium hypochlorite, chlorine, hydrogen peroxide, sodium peroxide, or sodium perborate. If bleaching powder is used the solution is taken weaker than in ordinary cotton bleaching. After bleaching and souring give a bath of antichlor and rinse in soft water. If the antichlor is omitted the goods are apt to turn yellow in stock, and the appearance of this color always means that the artificial silk has become tendered.

Messrs Cassella have recently taken out an interesting patent for dyeing mixtures based on the observation that those dyes which are fast or nearly so to peroxide of hydrogen or sodium, or to perborate or soda, are easily destroyed by these reagents in the presence of catalytic substances.

If a yarn impregnated with a metallic mordant is woven with yarn not so treated, and the fabric is dyed with colors fast to peroxide or perborate, and then acted on by a bath of one of them, the catalytic action shows itself by the destruction of the dye on the impregnating fiber. On the other hand, the yarn which was not impregnated retains the color of the dye intact. As an example, cotton yarn is mordanted with 3 per cent. of tannin, worked for half an hour in a solution of copper acetate, then dried and worked in a 1 per cent. solution of sodium sulphide at 100° F. These processes are repeated, and the cotton woven along with untreated yarn. The woven fabric is now dyed with Diamine Blue B F, rinsed and given a hot bath of, say, perborate of soda, which strips the impregnated yarn sufficiently well. Colored effects are also got by working up yarns from different fibers, or by dyeing a part of the yarn before weaving with dyes completely fast to either peroxide of soda or the perborate.

DETERMINING THE CLASS OF COLORS ON DYED COTTON FABRICS

BY SEMINOLE

It is impossible to determine with absolute certainty just which colors have been used to produce a shade. It is, however, a comparatively simple matter to identify the class to which the dye belongs. By a simple procedure it is possible to distinguish with certainty the method by which the fabric has been dyed. To detect a basic color, boil a clipping of the fabric in a 95 per cent. solution of alcohol and the color will bleed freely. A piece of tannin mordanted cotton can be dyed in the liquor to approximately the original shade. At the same time boil a clipping in a 50 per cent. solution of ammonia, along with a clipping of white cotton. If the color bleeds less than the alcohol test and the white is practically unstained, it is a basic color. If the liquor is colored deeper than the alcohol test and the cotton is heavily colored, it is a direct color.

Brilliant Green and Malachite Green are both destroyed by caustic alkalies. Auramine is not destroyed by hydrosulphite, but must not be confused with Primuline which is also not discharged. Auramine cannot be diazotized and developed like Primuline. Shades which have been topped with basic colors cannot be detected readily, but if the color on the alcohol test leaves a considerably different ground color, a basic-topped color may be suspected.

Direct colors are used extensively on cotton, wool and silk goods and may be found on almost any fabric. It is well to make the tests with a known direct, developed and after-treated color at the same time.

Direct colors when boiled in a 50 per cent. solution of ammonia with a clipping of white cotton, bleed to a large extent and color the white cotton deeply. After-treated and developed colors bleed a little, but stain the cotton very slightly. A wash test may also be made, direct colors generally staining white cotton, while the developed and after-treated colors are much faster to washing. Developed colors are in general much faster to cross-dyeing than the after-treated colors. This affords a method of distinguishing be

tween the two. Benzo Purpurin and similar reds are detected by spotting with a 10 per cent. solution of sulphuric acid. These colors turn blue or black, which distinguishes them from the Benzo and Diamine Fast Reds which are fast to acids. Primuline Red is discharged by Hydrosulphite to a yellow. This yellow may be rediazotized and developed to a red.

Sulphur colors are detected by the following tests: Boil in a 50 per cent. solution of ammonia with a clipping of white cotton. A sulphur color will not stain the liquor or white. Also boil in a test tube with tin crystals and hydrochloric acid. Moisten a filter paper with lead acetate solution and hold over the mouth of the tube. If the sample is a sulphur color a brown or black metallic spot will be formed on the paper. This is due to the hydrogen sulphide liberated from the sulphur dye.

Vat colors are also fast to boiling ammonia. If it is a vat color, it may be reduced in a hot alkaline bath with a subsequent return of color on exposure to the air. Heat a clipping in a beaker with a little caustic soda and add hydrosulphite when heated to about 160° F. A distinct change of color in the clipping and a coloration of the liquor occur if the sample is a vat color. Expose the clipping to the air. If a vat color it will oxidize back to nearly the original shade.

Sulphur colors are also changed by hydrosulphite, but do not show as great a change in color or change to the original shade on exposure. To show just how these reactions take place the following experiments are given: I took a vat blue, a sulphur brown and a direct brown and heated each to 160° F. in a caustic bath. The vat and sulphur colors did not bleed, whereas the direct color bled considerably. I now added an equal amount of hydrosulphite to each. The vat blue became yellow with a yellow coloration to the liquor. The sulphur brown became much lighter with a yellow colored liquor. The direct color was discharged to almost a white. On exposure to the air for twenty minutes the vat color became blue while the sulphur and direct colors were unchanged.

DYEING FROM DIFFERENT SOLVENTS

By J. HUBNER and H. B. AVERY, Manchester, England

A paper read at the meeting of the National Association of Cotton Manufacturers

It having been found that mercerized cotton dyes lighter shades than ordinary cotton when alcoholic solutions of dyestuffs are used in place of ordinary aqueous solutions, it seemed to be of interest to investigate the question of the absorption of dyestuffs by fibers from different solvents as well as from mixtures of these solvents with water.

A number of preliminary experiments were made in order to ascertain the temperature at which the dyeing, particularly in mixtures of alcohol and water, could be conveniently conducted. The difficulties experienced when high temperatures are used were so considerable that it was decided to conduct most of the experiments at ordinary temperature.

When dissolving the direct cotton dyestuffs in absolute alcohol, a considerable amount of residue was always left, which consisted partly of salt, Glauber's salt, etc., and of some dyestuff. In order to obtain solutions in alcohol and in water of the same strength and containing the same coloring matter, the dyestuff was placed in the filter thimble of a Soxhlet apparatus and extracted with absolute alcohol. In this manner a quantity of dyestuff which had separated from the alcohol was collected on a filter, carefully dried, ground, and finally sieved. Of this, equal quantities were dissolved in absolute alcohol and in water respectively.

It having been found the Benzopurpurin 4B only gave a very dilute solution in absolute alcohol, a number of dyestuffs were tried in order to find one best suited for these experiments.

Benzopurpurin 10B treated in the above manner gave perfect solutions both in absolute alcohol and in water, and it was, therefore, employed in all experiments.

The following table gives the solubility of Benzopurpurin 10B prepared as above, in different solvents:

Methyl alcohol	.042 grame in 100 cc.
Ethyl alcohol	.002 grams in 100 cc.
Glycerine	Very readily soluble
Water	Very readily soluble
Acetone	Very slightly soluble
Chloroform	Insoluble
Petrol	Insoluble
Ether	Insoluble
Amyl acetate	Insoluble
Carbon disulphide	Insoluble
Carbon tetrachloride	Insoluble

It seemed first to be of interest to accurately investigate the effect upon the color absorption of the addition of varying quantities of absolute alcohol to the dye bath. In order to obtain accurate results solutions of Benzo 10B in distilled water and in absolute alcohol respectively, containing 0.015 grams in 100 cc., were prepared; 100 cc. of the solution were used in each case. The fact that a decrease in volume occurs when alcohol and water are mixed was taken into consid-

eration, and the volume was, therefore, in every case made up to 100 cc. by adding the corresponding mixture of absolute alcohol and water. The hanks used were air-dried and all equal in weight. They were immersed in the dye bath contained in stoppered bottles for forty-eight hours at ordinary temperature.

Test	cc. Alcoholic Solution	cc. Aqueous Solution
1	100.0	0.0
2	99.5	0.5
3	99.0	1.0
4	95.0	5.0
5	80.0	20.0
6	50.0	50.0
7	20.0	80.0
8	5.0	95.0
9	0.0	100.0

After dyeing the hanks were removed, squeezed through a heavy mangle, and dried.

In another experiment each hank, after removal from the dye bath, was quickly rinsed in a mixture of water and alcohol in the same proportion as that in which it was dyed, and afterwards squeezed and dried. It was, however, found that this rinsing made no appreciable difference in the depth of the shades ultimately obtained, and the former method was, therefore, adopted throughout the experiments.

The hanks behaved in a peculiar manner when placed in the solutions. A curling up or twisting of Nos. 7, 8, and 9 was very apparent, while this behavior was not noticeable in the case of the other hanks. The alcoholic solution is orange red in shade, which becomes gradually bluer the more water is added.

Results: 1, 2, 3—About the same depth of shade; 4—Little bluer and heavier; 5—Very much bluer and lighter than 1, 2, 3, and 4; 6—Much lighter than 5, and bluer; 7—Much heavier than 6; 8, 9—About the same, little darker than 7.

The results obtained are remarkable in that the cotton absorbed less dyestuff from a mixture of alcohol and water than from either pure water or absolute alcohol.

The following experiment was carried out in order to find the point at which minimum absorption takes place. Unmercerized cotton yarn was used. The aqueous and the alcoholic solutions of Benzo 10B each contained 0.0112 grams of dyestuff in 100 cc.; 150 cc. of the solutions were prepared, and 25 cc. taken out for testing in the colorimeter. The hanks were, therefore, immersed in 125 cc. The weight of the air-dry hanks was 2.7137 grams each, and they were immersed for twenty-four hours at the ordinary temperature.

The dye baths were made up as follows:

	Aqueous Solution Per Cent.	Alcoholic Solution Per Cent.
1	0.0	100.0
2	1.0	99.0
3	5.0	95.0
4	10.0	90.0
5	15.0	85.0
6	20.0	80.0
7	25.0	75.0
8	30.0	70.0
9	35.0	65.0
10	40.0	60.0
11	45.0	55.0
12	50.0	50.0
13	55.0	45.0
14	60.0	40.0
15	65.0	35.0
16	70.0	30.0
17	75.0	25.0
18	80.0	20.0
19	85.0	15.0
20	90.0	10.0
21	95.0	5.0
22	100.0	0.0

Comparison of the shades of the hanks gave the following results: 2—Stronger than 1; 3—Stronger than 2; 4—Weaker than 3, equal to 2; 5—Weaker than 4 and 1; 6—Weaker than 5; 7—Little weaker than 6; 8—Weaker than 7; 9—Same as 8; 10—Weaker than 9; 11—Weaker than 10; 12—Stronger than 11, weaker than 8, bluer in shade; 13—Stronger than 12, equal to 8, bluer in shade; 14—Stronger than 13, weaker than 7, bluer in shade; 15—Stronger than 14, weaker than 7, bluer in shade; 16—Stronger than 15; 17—Stronger than 16; 18—Stronger than 17; 19—Stronger than 18; 20—Little stronger than 19; 21—Much stronger than 20; 22—Weaker than 21, between 1 and 2 in shade.

The results were further checked by comparing in each case the 25 cc. of solution taken out before immersion of the hanks with the remaining solution by means of the Dubosc colorimeter. It was found that for this purpose the 0.015 per cent. solutions were too strong. Dilution with water was first tried, but the intensely blue shade produced made comparison difficult. The difficulty was overcome by using absolute alcohol for diluting.

Taking the colorimeter readings of the standard in every case as 10, the figures given in the following table represent the average values of six readings.

Colorimeter Readings.	Amount of dyestuff absorbed by the cotton out of the total amount present in the dyebath.
1.....15.85	38.0%
2.....16.85	41.6
3.....17.60	44.2
4.....16.35	39.9
5.....14.20	31.0
6.....13.00	24.6
7.....11.60	15.6
8.....11.10	11.7
9.....10.75	8.5
10.....10.25	3.9
11.....10.20	2.0
12.....11.25	12.5
13.....11.36	13.2
14.....11.65	15.6
15.....12.15	19.0
16.....12.25	19.5
17.....14.25	31.0
18.....15.00	34.8
19.....14.25	31.0
20.....14.25	31.0
21.....19.00	48.3
22.....14.80	33.9

It should first be stated that the percentages of dyestuff absorbed, as found by means of the colorimeter, agree very well with the results obtained by comparison of the dyed hanks. Cotton absorbs the minimum quantity of dyestuff from a dye bath which contains 45 per cent. of water and 55 per cent. of absolute alcohol (by volume); the cotton absorbs slightly less dyestuff from pure water than from absolute alcohol, and more from alcohol containing 5 per cent. of water than from absolute alcohol.

The amount of dyestuff absorbed gradually and very evenly decreases from a dye bath containing 95 per cent. of alcohol to one which contains 45 per cent. of water and 55 per cent. of alcohol. At this point the cotton has only taken up 2 per cent. of the dyestuff contained in the bath as compared with 44.2 per cent. absorbed from the bath containing 95 per cent. of alcohol.

In the following experiment cotton yarn mercerized without tension, washed and air-dried was used. All the other conditions were identical with those in the former experiment.

The following results were obtained by comparison of the dyed hanks: 1—Pink, lightest shade; 2—A little heavier than 1; 3—Very much heavier than 2; 4—Very much heavier than 3; 5—A little heavier than 4, lighter than 16, but heavier than 15; 6—Much lighter than 5, same as 3, but bluer and brighter; 7—Little lighter than 6; 8—Lighter than 7; 9—Little lighter than 8, darker than 2; 10—Yellower than 9 and a little heavier; 11—Yellower than 10, about the same strength as 10; 12—Saem as 11; 13—Heavier than 12, lighter than 3; 14—Heavier than 13, equal to 3; 15—Heavier than 14; 16—Heavier than 15; 17—Heavier than 16; 18—Little lighter than 17; 19—Heavier than 18; 20—Heavier than 19; 21—Heavier than 20; 22—Little heavier than 21.

RESULTS OF COLORIMETER TESTS OF SOLUTIONS

Colorimeter Readings.	Amount of dyestuff absorbed by the cotton out of the total dyestuff present.
1.....13.2	24.3%
2.....13.8	27.5
3.....15.9	36.0
4.....17.7	43.6
5.....18.8	45.8
6.....17.5	42.9
7.....16.5	39.3
8.....14.0	28.5
9.....13.4	25.2
10.....14.1	29.0
11.....14.6	31.0
12.....14.9	33.0
13.....16.1	38.0
14.....18.5	46.0
15.....19.6	49.0
16.....25.2	60.4
17.....25.0	60.0
18.....28.2	64.5
19.....24.2	58.8
20.....27.2	63.3
21.....27.6	63.8
22.....34.8	71.3

It was observed that the shade of the mercerized hanks dyed from alcoholic solutions had a tendency to turn bluish when exposed to the air much more readily than that of unmercerized cotton.

The smallest amount of dyestuff is absorbed from absolute alcohol. An increase in the quantity absorbed is noticed until the dye bath contains 15 per cent. of water and 85 per cent. of alcohol. From this point the quantities absorbed decrease, and reach the minimum point when the dye bath contains 35 per cent. of water and 65 per cent. of alcohol. This figure is only slightly higher than that obtained from pure alcohol. Beyond this point the quantities absorbed gradually increase until the maximum is reached with pure water.

While ordinary cotton absorbs a slightly higher proportion of dyestuff from absolute alcohol than from pure water, mercerized cotton absorbs much less dyestuff from alcohol than from water. Further, mercerized cotton absorbs less dyestuff from absolute alcohol than ordinary cotton.

Experiments in which wool yarn was used in place of cotton yarn were also made, but, so far, shades too uneven for comparison have been obtained. The question is, therefore, still under investigation.

In the following experiment carefully purified spun-silk yarn was employed. The conditions were identical with those in the two former experiments.

Comparison of shades gave the following results: 1—Salmon pink; 2—slightly lighter than 1; 3—Slightly heavier than 1; 4—Slightly lighter than 2; 5—Much lighter than 4; 6—Little lighter than 5; 7—About same shade as 5; 8—Lighter than 7; 9—Lighter than 8; 10—Lighter than 9, almost undyed; 11—Same as 10; 12—Heavier than 11, about equal to 9; 13—Heavier than 12, about equal to 8; 14—Much heavier than 13, little heavier than 7; 15—Little heavier than 14; 16—Little heavier than 15; 17—Lighter than 16; 18—Very much heavier than 17; 19—Little lighter than 18; 20—Same as 19; 21—Slightly heavier and bluer than 20; 22—Much heavier and bluer than 21.

Colorimeter Readings.	Amount of dyestuff absorbed by the silk out of the total amount present in dyebath.
1.....14.6	31.5%
2.....14.3	30.0
3.....14.8	32.5
4.....14.0	28.5
5.....12.0	16.6
6.....11.9	15.9
7.....11.5	13.0
8.....11.6	13.9
9.....11.0	9.0
10.....11.0	9.0
11.....10.8	7.5
12.....11.0	9.0
13.....11.5	13.0
14.....12.4	19.5
15.....12.5	20.0
16.....12.8	21.8
17.....12.2	18.0
18.....13.8	27.6
19.....13.3	24.8
20.....13.5	25.9
21.....13.7	27.0
22.....15.6	33.0

Minimum absorption of dyestuff by silk from mixtures of alcohol and water takes place when

the dye bath consists of 45 volumes of water and 55 volumes of alcohol. The point is, therefore, practically identical with that obtained in the experiments with ordinary cotton.

RESULTS OBTAINED BY COMPARISON OF SHADES

1. Ordinary Cotton

2—Heavier than 1; 3—Little lighter than 2; 4—Lighter than 3; 5—Little lighter than 4; 6—Little lighter than 5; 7—Little lighter than 6; 8—About the same as 7; 9—About the same as 8; 10—About the same as 9; 11—Little lighter than 10; 12—Heavier than 11; 13—Same as 12; 14—Same as 13; 15—Little heavier than 14; 16—Same as 15; 17—Little lighter than 16; 18—Same as 17; 19—Same as 18; 20—Same as 19; 21—Same as 20; 22—Same as 21.

2. Mercerized Cotton

2—Lighter than 1, and yellower; 3—Heavier than 2, equal to 1; 4—Little lighter than 3; 5—About the same shade as 4; 6—About the same shade as 5; 7—About the same shade as 6; 8—Little heavier and bluer than 7; 9—Little heavier than 8; 10—Heavier and much bluer than 9; 11—Heavier and much yellower than 10; 12—About the same as 11; 13—Heavier than 12; 14—Little heavier and duller than 13; 15—Same as 14; 16—Lighter than 15; 17—Lighter than 16; 18—Same as 17; 19—Lighter than 18; 20—Little heavier than 19; 21—Same as 20; 22—Heavier than 21.

	Colorimeter Readings.		Per cent of dyestuff absorbed by the cotton out of the total amount present in the bath.	
	I. Ordinary Cotton.	II. Mercerized Cotton.	I. Ordinary Cotton.	II. Mercerized Cotton.
1.	13.6	17.4	26.5	42.5
2.	14.5	16.2	31.0	38.1
3.	14.0	17.5	28.6	47.8
4.	13.6	17.2	26.5	41.8
5.	13.3	18.2	24.9	45.0
6.	12.9	17.8	22.5	43.9
7.	12.8	17.4	21.9	42.5
8.	13.1	18.6	23.6	44.4
9.	13.1	18.8	23.6	46.8
10.	13.3	19.8	24.9	49.5
11.	12.9	23.3	22.5	57.0
12.	13.6	24.4	26.5	58.9
13.	13.0	27.8	23.0	64.0
14.	14.2	31.9	29.5	68.5
15.	14.2	42.5	29.5	76.5
16.	13.8	34.8	27.4	71.3
17.	13.5	33.6	25.8	70.2
18.	14.3	32.8	30.0	69.5
19.	—	—	29.0	72.0
20.	14.0	36.7	28.6	72.8
21.	13.5	35.0	25.9	71.5
22.	13.4	40.0	25.3	75.0

It will be seen from the absorption figures that methyl alcohol has practically no effect as regards the absorption of substantive dyestuffs by ordinary cotton, while mercerized cotton absorbs distinctly less dyestuff from pure methyl alcohol than from an aqueous solution.

In the following experiment the dye baths consisted of mixtures of water and glycerine. The proportions and the conditions of working were identical with the experiments in which ethyl alcohol was employed.

It should be pointed out that the results obtained by comparison of the shades differ somewhat from those obtained by means of the colorimeter. This is due to the difficulty experienced in getting the hanks dyed from solutions containing a large amount of glycerine perfectly dry.

RESULTS OBTAINED BY COMPARISON OF SHADES

1. Ordinary Cotton.

1—Practically undyed; 2—Slightly tinted; 3—Little stronger than 2; 4—Little stronger than 3; 5—Little stronger than 4; 6—Little stronger than 5; 7—Much stronger than 6; 8—Much stronger than 7; 9—Stronger than 8; 10—Same as 9; 11—Little stronger than 10; 12—Stronger than 11; 13—Stronger than 12; 14—Stronger than 13; 15—Stronger than 14; 16—Stronger than 15; 17—Stronger than 16; 18—About same as 17; 19—Little stronger than 18; 20—Little stronger than 19; 21—Little stronger than 20; 22—Little stronger than 21.

2. Mercerized Cotton.

1—Slightly tinted; 2—Little stronger than 1; 3—Little stronger than 2; 4—Much stronger than 3; 5—Much stronger than 4; 6—Much stronger than 5; 7—Much stronger than 6; 8—Little stronger than 7; 9—Stronger than 8; 10—Stronger than 9; 11—Stronger than 10; 12—Stronger than 11; 13—Same as 12; 14—Same as 13; 15—Stronger than 14; 16—Stronger than 15; 17—Stronger than 16; 18—Stronger than 17; 19—Stronger than 18; 20—Stronger than 19; 21—Stronger than 20; 22—Stronger than 21.

	Colorimeter Readings.		Per cent of dyestuff absorbed out of the total amount present in the dyebath.	
	I. Ordinary Cotton.	II. Mercerized Cotton.	I. Ordinary Cotton.	II. Mercerized Cotton.
1.	10.4	10.6	3.8	9.1
2.	10.5	10.9	4.7	8.2
3.	10.6	10.1	5.5	9.8
4.	10.3	11.3	2.9	12.4
5.	10.6	11.7	5.5	14.5
6.	10.7	11.8	6.5	15.2
7.	10.2	13.4	2.0	25.3
8.	10.9	12.8	8.2	21.8
9.	11.0	14.9	9.0	32.8
10.	11.2	15.0	10.7	32.3
11.	11.5	17.7	13.0	43.5
12.	11.8	20.1	15.2	50.2
13.	12.8	21.0	21.8	52.4
14.	12.2	33.7	18.0	70.3
15.	12.2	24.5	24.2	59.1
16.	13.4	29.6	25.3	66.2
17.	13.4	35.0	25.3	71.4
18.	14.1	37.2	29.0	73.1
19.	15.2	40.5	34.2	75.3
20.	16.2	41.0	38.2	75.6
21.	16.3	41.5	38.6	75.9
22.	16.0	37.0	47.5	78.8

The hanks immersed in glycerine without the addition of water remained practically undyed, and it was found that immersion of the cotton for a period of over two months did not produce any marked change.

The amount of dyestuff absorbed decreases fairly steadily with the increase of the amount of glycerine present in the dye bath. It will be noticed that at two points in each curve increased dyestuff absorption takes place in the case of mercerized cotton while at the identical points the

absorption figures for the unmercerized cotton fall considerably.

A decrease in dyestuff absorption similar to the one noticed in the experiments with glycerine, but not as pronounced, was observed when acetone was added to the dye bath. Before drawing any conclusions it will be necessary to more fully investigate this matter on account of the fact that while Benzopurpurin 10B is very readily soluble in glycerine it is practically insoluble in acetone.

Dye Recipes

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation. Subscription price for the Dyers' Supplement $1.00 per year.

Recipe No. 73

TAN ON WORSTED DRESS GOODS

For 100 lbs. goods. Prepare the dye bath with

1 oz., 95 grains Amazo Fast Red 8B.
2 ozs., 46 grains Amazo Fast Yellow 6G.
112 grains Amazo Fast Blue.
(American Dyewood Co., 80 Maiden Lane, New York City, N. Y.)
20 lbs. Glauber's Salt.
1½ lbs. Oil of Vitriol.

Start dye bath at 120° F., bring to boil in 20 minutes. Boil 1 hour.

The above shade is produced with colors of exceptional fastness and excellent level dyeing properties.

Recipe No. 74

BLUE ON WORSTED DRESS GOODS

For 100 lbs. goods. Prepare dye bath with

14⅜ ozs. Amazo Fast Blue.
420 grains Amazo Fast Red 8B.
56 grains Amazo Fast Yellow 6G.
(American Dyewood Co., 80 Maiden Lane, New York City, N. Y.)
20 lbs. Glauber's Salt.
2 lbs. Oil of Vitriol.

Start dye bath at 120° F., bring to boil in 20 minutes and boil 1 hour.

The colors employed to produce the above shade are recommended for their level dyeing properties and where exceptional fastness is required.

Recipe No. 75

BLACK ON COTTON YARN

Diamine Black B H F on 100 lbs. cotton yarn. Prepare the dye bath with

6 lbs. Diamine Black B H F.
(Cassella Color Co., 182 Front St., New York, N. Y.)
25 lbs. Common Salt.
1 lb. Soda Ash.

Dye at a boil for one hour, then diazotize in a cold bath made up with

3 lbs. Sodium Nitrite,
4 lbs. Sulphuric Acid,

working for 20 minutes, and then developing in a bath made up with

2 lbs. Developer V

dissolved in the necessary amount of caustic soda solution.

Diamine Black B H F possesses excellent fastness to washing for a color of this type.

Recipe No. 76

BLUE ON COTTON YARN

Oxamine Fast Blue R R on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Oxamine Fast Blue R R.
(Badische Co., 86 Federal St., Boston, Mass.)
40 lbs. Glauber's Salt (Crystal).
1 lb. Soda Ash.

Enter at 180° F., and dye at a boil for 1 hour.

Oxamine Fast Blue R R possesses the usual properties of a direct cotton color.

Recipe No. 77

GREEN ON WORSTED YARN

Acid Green Y Y on 100 lbs. worsted yarn. Prepare the dye bath with

2 lbs. Acid Green Y Y.
(Innis Speiden & Co., 46 Cliff St., New York, N. Y.)
20 lbs. Glauber's Salt.
2 lbs. Sulphuric Acid.

Enter at 140° F., and dye at a boil for 1 hour.

Acid Green Y Y is a level dyeing color of satisfactory fastness for most purposes.

Recipe No. 78

GRAY ON COTTON YARN

Dianil Fast Gray B L on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Dianil Fast Gray B L.
(Farbwerke Hoechst Co., 122 Hudson St., New York, N. Y.)
25 lbs. Common Salt.
2 lbs. Soda Ash.

Enter at 180° F. and dye at a boil for 1 hour.

Dianil Fast Gray B L is well suited for apparatus dyeing, and is fo some interest in calico printing in that it is discharged to a pure white by Hydrosulphite N F Conc.

Recipe No. 79

ORANGE ON COTTON YARN

Dianil Orange G S on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Dianil Orange G S.
(Farbwerke Hoechst, 122 Hudson St., New York, N. Y.)
40 lbs. Glauber's Salt (Crystal).
2 lbs. Soda Ash.

Dye at a boil for 1 hour.

Dianil Orange G T exhibits very good fastness for a direct cotton color, and is not sensitive to metals. It also has an advantage in its low cost.

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Recipe No. 80

SCARLET ON COTTON YARN

Para Scarlet 6 B Extra on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Para Scarlet 6 B Extra.
(Farbenfabriken of Elberfeld Co., 117 Hudson St., New York, N. Y.)
40 lbs. Glauber's Salt (Crystals).
2 lbs. Soda Ash.

Enter at 180° F., and dye at a boil for 1 hour, then couple with Parazole F B as follows. Stir

4 lbs. Parazole F B (Powder)

into a thick paste with a very small quantity of cold water and then bring into solution by pouring in more water. Pour this solution into the cold developing bath and add

4 ozs. Soda Ash,
4 ozs. Acetate of Soda.

The bath should be neutral.

The dyed yarn is then worked in this bath for 1/2 hour. After coupling is completed it is advisable to soap at a boil. Para Nitraniline diazotized may be used in place of Parazole F B.

Para Scarlet 6 B Extra, when applied in this manner, possesses very good fastness to washing.

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Recipe No. 81

BLACK ON COTTON YARN

Naphtamine Fast Black S D E on 100 lbs. cotton yarn. Prepare the dye bath with

6 lbs. Naphtamine Fast Black S D E.
(Kalle & Co., 530 Canal St., New York, N. Y.)
1 lb. Soda Ash.
30 lbs. Common Salt.

Enter at 180° F., and dye at a boil for 1 hour. Rinse and diazotize by working for 20 minutes in a cold bath made up with

4 lbs. Nitrite of Soda,
4 lbs. Sulphuric Acid.

Then rinse well and develop in cold bath made up with

1½ lbs. Beta Naphthol

dissolved in the necessary amount of caustic soda.

Naphtamine Fast Black S D E possesses very good fastness to light and washing.

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Recipe No. 82

BLACK ON WORSTED YARN

Kresol Black S T on 100 lbs. worsted yarn. Prepare the dye bath with

6 lbs. Kresol Black S T.
(Geisenheimer, 189 Front St., New York, N. Y.)
20 lbs. Glauber's Salt (Crystal).
4 lbs. Sulphuric Acid.

Enter at 140° F., and dye at a boil for 1 hour.

Kresol Black S V will not stain white cotton threads, and possesses especially good level dyeing and penetrating properties.

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Recipe No. 83

GREEN ON WORSTED PIECE GOODS

Brilliant Alizarine Green 450 on 100 lbs. goods. Prepare the dye bath with

2 lbs. Brilliant Alizarine Green 450.
(F. E. Atteaux & Co., 174 Purchase St., Boston, Mass.)
20 lbs. Glauber's Salt
4 lbs. Sulphuric Acid.

The goods are entered at 120° F., raised to a boil and boiled for 1 hour. This color is of very good fastness to light, alkali and acid and will stand a moderate milling when dyed in an acid bath. If after treated with chrome, the fastness to fulling is considerably improved. It may be used as a shading color and for ladies' dress goods, and also in conjunction with chrome mordant and chromate colors. Furthermore this color can be used to advantage in union dyeing, as it dyes the wool very good indeed in a neutral bath.

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Recipe No. 84

RED ON WORSTED DRESS GOODS

Anthranol Rubinol on 100 lbs. goods. Prepare the dye bath with

2 lbs. Antharnol Rubinol.
(F. E. Atteaux & Co., 174 Purchase St., Boston, Mass.)
20 lbs. Glauber's Salt.
4 lbs. Sulphuric Acid.

Enter at 120° F., raise to a boil and dye at the boiling point for 1 hour.

Anthranol Rubinol has been extensively used by woolen and worsted manufacturers for shading purposes, particularly with navy blues. It is an extremely level dyeing color and possesses very good fastness to light and other requirements. It may also be dyed by the chromate process.

New Machinery and Processes

This department is designed to present from month to month a brief mention of new machinery, devices and processes being brought out in this country and abroad, that are of interest to the textile manufacturers. It is not a list of patents but of improvements on the market, the idea being to present to our readers a systematic monthly record of new machinery, etc., of interest to textile mill men.

Whenever possible we endeavor to make a personal investigation of the new machinery and processes described in this department. In the absence of such personal investigation we must necessarily rely upon information obtained from those who control the machines and processes.

We invite machine builders and others to send us such information for this department.

Reel Dyeing Machine. The Tolhurst Dyeing Machine Co., Troy, N. Y., are placing on the market an improved reel dyeing machine for piece goods. A description appears in this issue.

Builder for Twister Frame. Brooks & Doxey, Manchester, England. An improved bobbin building motion for ring twisting frames. A number of frames equipped with this motion are in operation in Lancashire mills.

Dirt Grids for Cards. Bradleys Ltd., Bolton, England. An improved dirt grid for carding machines. A number of the grids are in use in Lancashire mills and are giving satisfaction.

A Dyeing Machine. The Wilh. Schiffers Maschinenfabrik, Aix-la-Chapelle, Germany. An improved dyeing machine for textile materials which operates on the pack system. The material is dyed, rinsed and hydro-extracted without removal from the machine. A number of these machines are in operation in Yorkshire, England. A large production is claimed, one firm stating that they can dye from eight to twelve dips per day in the Schiffers machine.

Mercerizing Machine. John Downham, Bury, England. An improved mercerizing machine for piece goods which is said to turn off a large production of good work.

Loom Reed for Fine Work. W. Wagner, Ronsdorf, Germany. A loom reed for weaving cloths having a large number of ends of fine yarn per inch. Every other wire in the reed is set at such an angle as to cross the other wires at the center, leaving a space between them at the top and bottom. The point of contact in the center serves for beating the filling into the cloth, while the separation at the top and bottom prevents the chafing of the yarn.

Lappet Lifting Device. Howard & Bullough, Accrington, England. An improved attachment for lifting the lappets of spinning frames which is said to embody a number of advantages.

Chain for Long Filling Patterns. S. Wilkinson, Colne, England. An attachment by which long filling patterns can be woven on circular box looms with a comparatively short chain.

Yarn Reel. Beattie & Turner, Preston, England. A yarn reel by which after doffing, all the threads are attached simultaneously and held ready for the starting of the reel.

Measuring and Ticketing Machine. The Wilanport Co., Ltd., Leeds, England. A machine for measuring and ticketing piece goods. Tickets are attached at regular intervals indicating the length of the piece.

Cloth Measuring Machine. Thomas Kirby, Leeds, England. A machine for measuring cloth. The length is indicated by a clock driven by a wheel that presses against the cloth moving over a table.

Hosiery Dyeing Machine. Joseph Schmitz, 3213 Frankford Ave., Philadelphia, Pa., is bringing out a machine for dyeing sulphur black, also developed black for cotton and silk hosiery. It has been in operation at the Universal Dye Works, of which he is proprietor, for over a year and is claimed to give very satisfactory results.

THE FRANCKE FLEXIBLE COUPLING

The aim in power transmission is to provide dependable, continuous and economical operation. The best modern practice for large or small machinery direct connects all apparatus wherever possible. All such units, however, are subject to trouble from accidental misalignment. This may result in

FIG. 1

heating and wear of bearings, power loss through friction and vibration, shaft wear and breakage, or in coupling trouble. Any of these alone or in combination will in time make necessary a shut down of the mill. Understanding the difficulty and expense of

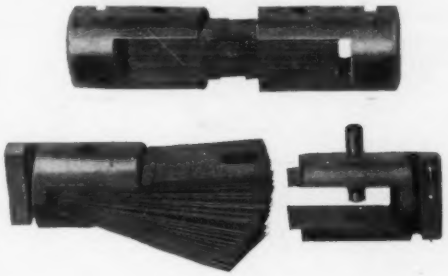


FIG. 2

obtaining and the impossibility of maintaining perfect alignment in direct connected units, textile mill owners and operators will welcome the Francke flexible coupling, which resembles a rigid coupling except that the flange faces are slightly separated as shown at Fig. 1. Power for power, and bore for bore, this coupling is almost equal in dimensions to a rigid flanged coupling, except that the Francke is shorter in overall length. The similarity stops with the appearance. Instead of using rigid bolts to do the driving, the flanges of the Francke coupling are connected by flexible all steel pins.

Fig. 2 shows one of the flexibl eunits and the construction of the pins with laminated clock spring steel. The long leaves, with

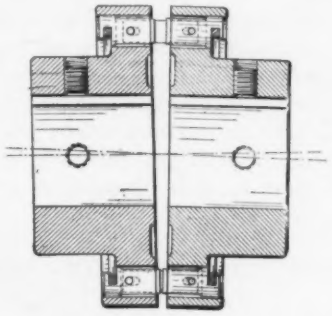


FIG. 3

the elongated hole do the driving, while the short ones are simply used as shims between the driving leaves and the short steel keep-

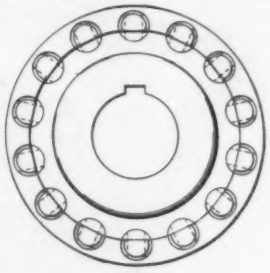


FIG. 4

ers, as the end pieces are called. No strain comes on the hardened steel cross pins which are pressed into keepers to make the pins an easily handled unit. A slip snap ring holds the keeper stationary in the flanges.

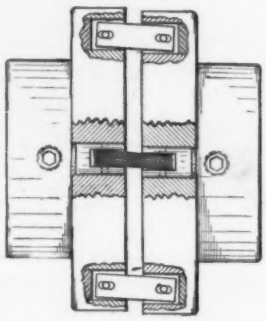


FIG. 5

As shown in Figs. 3 and 5 the long leaves are free to slide, rock or bend. With a very slight movement between hardened steel sur-

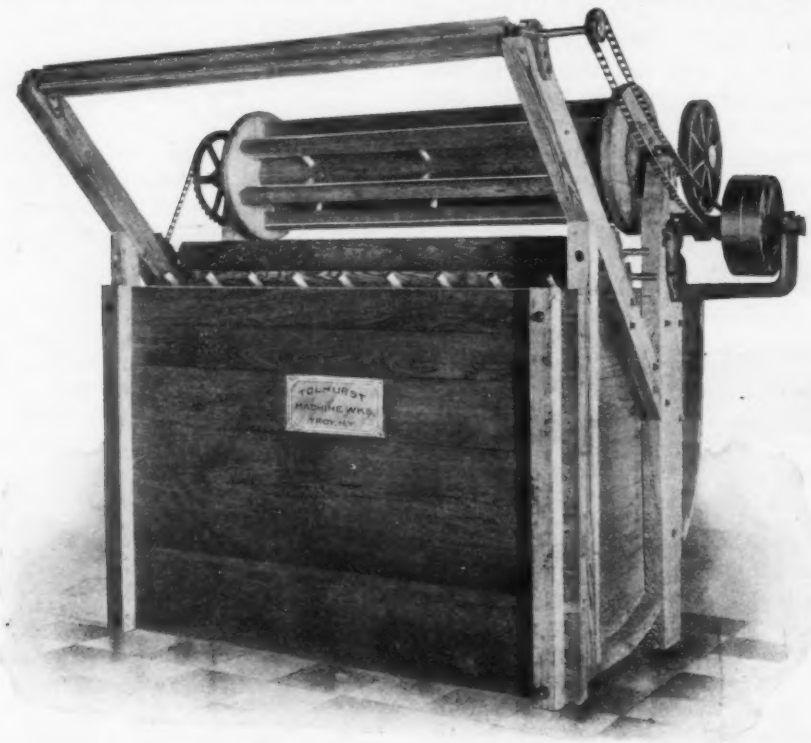
faces this takes care of any accidental misalignment.

The users of Francke flexible couplings speak very highly of them. They have been used on many classes of work among which are steam, gas and oil engines direct coupled to generators, pumps, compressors, etc. The Francke coupling is marketed by the Smith-Serrell Co., Inc., as general sales agent for the Francke Co., with offices at 90 West St., New York.

THE TOLHURST REEL DYEING MACHINE

Piece dyers will be interested in the improved reel dyeing machine, shown in the accompanying illustration, and which is built by the Tolhurst Machine Works, Troy, N. Y. The tub and reel are made of either cypress, cedar or pine and special care has been taken to prevent the danger of rust spots caused by goods coming in contact with iron. The reel is driven by heavy back gears which insures quick starting and a steady speed of the pieces through the liquor. The outlet consists of a bronze seat or thimble, provided with either a wood or bronze plug, as desired. The guide pins can be easily replaced in case they become broken, and a loose pin guide plank is furnished, if desired, permitting of running different numbers of strings or rolls.

The front partition in the tub gives ample space for steam connections and the mixing of the dye liquor. A doffer roll enables the goods to be removed rapidly from the reel and is located at either the front or back, as desired. The squeeze rolls are made with extra heavy shafts, the rolls being of yellow pine and very strong and durable. They are driven by a sprocket from the reel shaft, thus preventing any stretching of the goods between the rollers and the reel. The machine



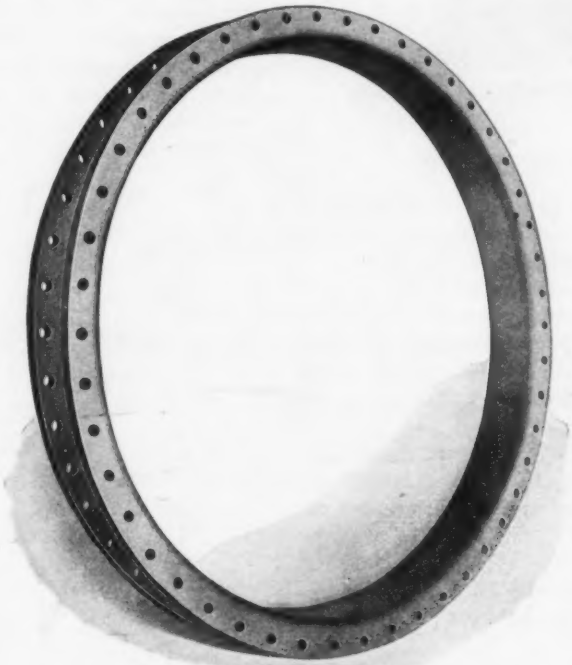
THE TOLHURST REEL DYEING MACHINE

is adapted for dyeing or bleaching fabrics in the roll or string.

THE BADGER SELF-EQUALIZING EXPANSION JOINT

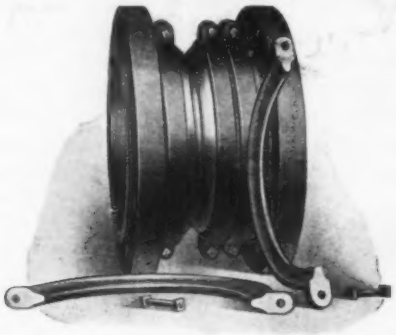
The Badger self-equalizing expansion joint is a corrugated copper joint having external rings. It is designed to take up changes in length in pipe lines, whether these pipe lines convey steam, water or air. Every engineer has probably had experience with the irresistible strains in pipe lines caused by expansion and contraction. Loose, leaky fittings and perhaps here and there a fractured joint point conclusively to the necessity for some device having sufficient flexibility to absorb these changes in length. The engineer also knows that the amount of change in pipe length depends upon two factors, the length of the pipe and the difference in temperature. Although old-fashioned bends and long sweeps and loops are useful in making changes in direction and have been used quite extensively for taking care of changes in length, they are not beautiful and they take up much valuable space, while cracks are liable to develop under repeated temperature changes. The slip joint has the one disadvantage of requiring frequent packing.

The Badger joint combines the elasticity to stand repeated changes of shape with strength to resist any pressure for which the joint is designed. The well-known corrugated form such as used for furnaces of internally fired marine boilers is adopted because of its strength and flexibility. A single piece of copper would have to be very thick for high pressures, and in actual practice it is found that there is always a tendency for one or two corrugations to take the entire strain of repeated change in shape. In time those few corrugations taking all the work would give out. External rings on the corrugations of the Badger joint distribute the strains among several corrugations, and by bringing many corrugations into service no one of them is called upon to take more than its share of the work. The external rings



THE BADGER EXPANSION JOINT FOR LOW PRESSURE

force a part of the strain to the next corrugation. As such corrugation has but a slight movement the joint lasts almost indefinitely.



THE BADGER EXPANSION JOINT

The external rings give added strength to the joint in the same way that spiral winding of a pipe with wire adds to its strength.

The number of corrugations depend upon the pressure and upon the length of the joint. For high pressures and superheated steam the change in length is considerable and more corrugations are used. For very low pressures, as in exhaust piping, two or three corrugations are sufficient for the slight alteration in length. In some cases where the expansion is slight, vibration must be taken up and the joint does not need any external rings. In most cases external rings are used to add strength for high pressure and also to stiffen the exhaust pipe against collapse.

The Badger expansion joint is made by the E. B. Badger & Sons Co., 63-75 Pitts St., Boston, in a complete line of sizes for all pressures and with flanges drilled to A. S. M. E. standards, both high pressure and extra heavy pressure. These joints require no packing and take up no more room than a pipe fitting. For low pressure work, they have been made up to 6 feet in diameter and have been made oval, rectangular, circular and in special forms.

One Chinese tradition is that silk weaving was practiced in Kiang Nan, China, in 2640 B. C. Another is that cotton originated in India, and that shawls and carpets were first woven in Persia.

A PORTABLE PERCENTAGE SCALE

The illustration shows a portable percentage scale for which Alfred Suter, 200 Fifth Ave., New York, is the selling agent. This scale shows without calculation the percentage of noil made on the combing machine, and also the actual weight in grains of the top and noil. The instrument is of very substantial construction, being fitted with a ball bearing socket which makes it very strong and sensitive. It can be easily carried from one room to another and suspended in any convenient position near the combing machine. It enables the overseer to keep informed at all times as to the amount of noil being made and thus to adjust the machines

THE SUTER PORTABLE PERCENTAGE SCALE

to any excess or deficiency of noil. Mr. Suter carries these scales in stock so that orders can be filled on short notice.

The total number of persons engaged in the manufacture of cotton goods in 1909 was 387,771; in the hosiery industry, 136,130 persons in the woolen, worsted, felt goods and wool hats.

The imports of cotton hosiery from the United States for January, 1913, amounted to 184,149 dozen pairs, valued at $209,010.

A PRODUCTION TABLE FOR CIRCULAR KNITTING MACHINES

The illustration shows the souvenir production table which was given out by the Wildman Mfg. Co. of Norristown, Pa., at the Hosiery Exhibition in May. This souvenir contains more useful information in regard to knitting than would be expected at first sight. The method of using the table is thus explained by Ernest Tompkins, who designed it:

It gives the production of circular rib machines for the ordinary ranges of feeds and needles per inch. The yarn for any particular cut is taken at what has been found to be a fair average. Put the figure representing the needles per inch in the middle of the lower opening, and a suitable yarn will be found on the outer circle. Six cut, No. 6 yarn is suitable, as the illustration shows. These two sixes make it easy to remember the rule that the yarn is proportional to the square of the needles per inch. The rule in this case is needles per inch squared, divided by six, equal the yarn number. The needles per inch squared are $6 \times 6 = 36$. For latch needle rib machines the number by which the 36 is divided is 6. Consequently, the yarn to use is 6. Therefore, the expression $6 = 36 \div 6$ shows the relation of the yarn and needles per inch for a six cut latch needle rib machine, and helps to call to mind the rule for all other ordinary cuts. For example, for 10 cut, yarn $= (10 \times 10) \div 6 = 100 \div 6 = 16.7$. This rule should not be used below four cut. The yarn numbers used in the table illustrated were derived by the rule, so if the table is not at hand the yarn for any cut may be calculated almost mentally.

THE WILDMAN SOUVENIR PRODUCTION TABLE

Notice that for 6 cut the production for one feed is given at the bottom of the radial opening as 20 pounds. This is the nearest whole number to 121 divided by the yarn number, 6. The general rule is that the production is inversely proportional to the yarn number and the special rule used in this case is production for one feed $= 121 \div$ yarn number. Consequently, for 10 yarn on the corresponding cut, the production of one feed is 12 pounds. With this rule anyone can derive the production in case he has lost the table. Of course, for two feeds the produc-

tion is twice as much as it is for one, neglecting lost time.

Many recipients of the souvenir asked where the variation for diameter came in, and some were incredulous when told that it did not come in because it had been ruled out. A glance at the speed table shows that the needle velocity is kept constant, which fact eliminates the diameter.

Other recipients said, But how about the stitch? Well, the stitch is given at four inches of needles to one foot of yarn, which is an average stitch. If the yarn is what is called for by the rule, yarn equals cut squared divided by six, and if the stitch is so set as to make a good piece of fabric, it will be found that one foot of yarn occupies about four inches of needles. Make it exactly four inches of needles, and keep to the speed and the production will be as given. Some doubt this. It is natural to doubt in an industry which for over three hundred years has been the champion realm of guess, and most of the guesses bad ones. Seeing is believing. Let the doubter put the table to the test, but if he wagers on the result he had better back the table.

For flat work such as is made on loop wheel machines add 25 per cent. to the production for the yarn and feeds used. For flat fleeces in which the back is 100 per cent. of the face use 2 1/2 times the production given in the table. The needles per inch do not apply for flat work.

Those who did not get souvenirs at the Exhibition may get theirs by writing to the Wildman Mfg. Co., Norristown, Pa.

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COOPERATION AMONG MANUFACTURERS

By CHARLES H. FISH, 85 Devonshire St., Boston, Mass.

A paper read at the meeting of the National Association of Cotton Manufacturers

In attempting a short paper on a well worn subject, the importance of cooperation in business, I realize that I may not go far without saying things that appear to reflect on those who do not in the least deserve it, but I hope it will be understood that it is far from my intention to do so.

Speaking generally, the conditions today in the American textile trade are not altogether satisfactory, especially so from the fact that the results you are actually to obtain, as far as profits are concerned, are almost always uncertain, and we cannot at any time look forward over one season and know where the next season will land us. This statement applies, I think, to the textile industries more than to any other of the important industries. Our good years are often followed by bad years, or several bad years, and I am free to say that more or less of the troubles that cause these unsatisfactory results arise from conditions that are, or should be, under our control.

That our costs for manufacturing are higher than they should be, and that additional economies must be practiced is no doubt true. Such a statement will always hold good to a greater or less degree, for perfection will never be reached, neither will we ever be able to say with truth that we are doing well enough in this respect.

Not so many years ago the operations in our factories, as compared with today, were conducted in a careless and indifferent way, but in spite of this the business generally prospered. In these old times, and as I say not so many years ago at that, there were extravagances in manufacturing, some made necessary by the inefficiency of, or the absence of, machinery. The product per unit was comparatively small, the losses from waste were large, transportation was a serious item, in fact the actual energy expended in producing a pound of finished product was many times what it is today, although not so much so the manufacturing cost. Our fathers thought they were doing well, and from their viewpoint, the viewpoint of the times they were, but in the meantime with the introduction of new inventions and improved machinery, and with an accumulative experience going back to our fathers' fathers and before, the viewpoint has greatly changed. But with our new outlook, with all our new inventions and improved conditions, are we able to discover in ourselves any greater degree of commercial success than we must accord to our fathers and forefathers with all their handicaps?

Is it a fact that the state-of-the-art in textile manufacturing has advanced less rapidly than it should have, and that today, in spite of the enormous markets, our general costs are so high that the profits are always uncertain? Or, is it that although the art of textile manufacturing may have had its just and reasonable improvement or advance, the fault is that the intrinsic value of the product is questionable and that we are in error in trying to produce so much of a product that the public has little use for; or, is it that those who purchase are wise and with a sort of a little combination of their own, place a limit on the price they will pay, this limit often so low that it makes profits to the mills a matter of uncertainty?

It seems to be a fact that the trade has a habit of paying too little for our goods, or else too much, or too large a percentage of the price they do allow is absorbed in one way or another before it appears as net profits.

To be sure, our machinery has improved and is generally good and efficient; our mill buildings are, as a rule, first class; our methods of manufacture are as good, maybe, as anyone's, as in this respect the state of the art has advanced wonderfully; but in the matter of some of the details connected with the handling of our factories, machines and operatives, as well as in the merchandising of our product, we have not progressed as we should, and great improvement is possible.

In the first place, are we not acting too much as individuals and too little as members of one

great family, the success of which affects, directly or indirectly, the success of its every member?

Have not many of us overlooked too long the importance of public spirited cooperation? Should we not get nearer together in matters that affect the general welfare of the industry? Do not abuses of any kind that affect one district, affect the whole, and are there not a number of abuses, so-called, that can be checked only by intelligent united actions?

I know that attempts have been made many times in the past and attempts are now being made continually, in one way or another, to interest textile manufacturers in the great question of unselfish cooperation, but how many of us, outside of a comparatively small circle, have given the matter sincere thought and attention?

We should be in sympathy with such a movement and show our interest in some way, for indifference would indicate a selfish satisfaction with our own success and indifference to the success or failures of our brother manufacturers, which is not the case.

Unfortunately, the most powerful factors in our industry are the most successful, or to put it the other way, those who are the most successful have the greatest influence, while at the same time, being successful they naturally feel less the necessity for cooperation. It is the medium sized and smaller members who are the most affected or who suffer most from the absence of cooperation.

To be more explicit, let me call your attention to the general labor situation throughout the mills and factories of this country. What sort of an understanding, to say nothing of an organization, have we to combat the unjust demands of labor?

No understanding and no organization is necessary where just demands are made upon us, for no man should require assistance in agreeing to that which is right, but it is a short-sighted policy that leaves one mill, or one city, or one district, to fight alone a battle that is in truth a battle waged in the interest of the whole industry, against unjust and unreasonable demands, the results of unnecessary, unfair and ignorant labor agitation.

Those of us in the South are altogether too indifferent and too contented if labor troubles appear in the North, so long as they remain there, and vice versa; and those of Rhode Island are too glad that Lawrence and Massachusetts are getting it, and not themselves, and Massachusetts in its turn may have a thrill of satisfaction when her troubles are over and Rhode Island is having them, and so it goes.

It is human I know, but will this detached or individual effort be sufficiently effective in the times to come? Shall we close our eyes and let our worthy brother in trouble stand or fall, trusting to fortune that we ourselves may escape and live to take advantage perhaps of this calamity?

I do not believe that the victory of winning a strike is more glorious or more effective than the victory of preventing one, and a proper or sensible organization of the manufacturers throughout the United States will go a long way in clearing up a labor situation, which is now most threatening, and at the same time operate to the advantage of the working man and woman, our employees, as well as to the industry as a whole.

To return to the manufactured product, which we will allow we have produced at the lowest practical cost. There then comes, as you know, the most important question of disposing of it in such a way that the manufacturer will get at least fair play as against the consumer. The fluctuations of the market cannot always be controlled, but I believe some action can be taken that may at least now and then favor the manufacturer by keeping prices more uniform, more staple, or more nearly in proper relation to the cost of the raw material.

Generally speaking, all fabrics are made to fit a certain prescribed and pretty rigidly adhered to price, these being figured with the jobber's or retailer's interest in mind. Unfortunately for the manufacturer, these prices are largely influenced by the demand, and the price of the raw material, or the manufacturing costs, become a secondary consideration.

During one short season the raw material may advance in value 100 per cent. and labor and supplies that go to make up the manufacturing costs may also materially increase, but the selling price, for reasons given, never were known to increase in anywhere near the same proportion. In fact, no matter how the price of cotton may jump upwards from day to day or no matter what the increase in the cost of producing may be, the selling values if they move at all move in only a moderate and listless fashion.

I do not know as any amount of cooperation among manufacturers can improve those conditions; at the same time, it is well worth considering.

Again there is a law which prevents combinations in restraint of trade, in which we have no interest, for this is not our purpose. We should have, however, an interest in a law which prevents commercial murder, deliberate or otherwise.

There must be some way of counteracting the desire of those who, either from ignorance as to their manufacturing costs or for other reasons, deliberately name prices which invite disaster, not only to themselves but to others. The fact that such as these are very sure to come to grief sooner or later, does not in any way help the immediate situation.

Let us for a moment consider that branch of cotton business that pertain to printing and piece dyeing, which will perhaps serve as further illustration. No branch in all the textile lines calls for more courage on the part of the manufacturer, and no branch where the manufacturing risks are so great. There is no branch that requires so large a percentage of theoretically educated men, chemists and chemical engineers, designers and engravers, essentially backed by long experience in the work. Throughout every department, and almost in every process, the slightest error on the part of a common workman will destroy yards, or hundreds of yards, of cloth, to say nothing of the loss of labor, color, drugs, etc., added to it since it left the mill.

There are few fixed mechanical processes as in the cotton mill, each class of coloring and almost each piece, receiving special treatment.

The products of our print works are beautiful in design, splendid in execution and in finish, printed with pure colors which today are mostly absolutely fast to light and to washing. Sold in the markets under conditions of price competition which make profits difficult, or at times practically impossible; and for this there seems to be no excuse or no apparent reason, except the same lack of co-operation.

Here is a case where with a proper organization cooperation should be possible, for the printing business is not so extensive or so widely distributed.

Would it be impossible, or at least impractical, for those interested in this branch of the industry to work together through a committee or otherwise, to the extent of impartially comparing results and drawing up and agreeing upon a code of prices that would be fair to all, including the consumer?

While the trade is in the mood to buy, it will usually pay the price asked, if that price be fair, and the uniform addition of a small fraction of a cent per yard, entailing no hardship on the purchaser or consumer, would seem warranted as protecting the manufacturer or the printer against a loss.

For further illustration in a different direction, let us refer to the records of the recent tariff hearings before the ways and means committee at Washington.

This committee, seeking information for their proper guidance, invited the cooperation of the manufacturers everywhere. Only a comparatively few of the textile fraternity appeared before them, although they were some of the keenest and best informed members. It goes without saying that they acquitted themselves with as much credit as was possible under the conditions, as the situation was certainly most trying, but from what I understand their testimony was accepted by the examining committee more generally as individual opinions or protests, influenced often by personal connections, and as such were accepted as valuable; the fact that no one appeared as representing the industry as a whole was commented upon.

Would it not have been a reasonable business proposition to have had the testimony of these able gentlemen supplemented by a concise and comprehensive report of a committee representing the textile interests of the entire country, or, if you please, have had these same gentlemen appear as a committee, united in purpose for the benefit of all? If not that, every manufacturer in the country, either in person or by proxy, should have appeared before the committee, as an expression of their interest in a fair and reasonable, but effective, protection for the industry.

Cannot the absence of such a representative committee be looked upon as indicating general indifference as to the results, or over confidence in our manufacturing supremacy.

I realize that there is much in these ideas that can well be called theory, and I throw them out only for what they are worth.

I also know that any suggestion of cooperation is not altogether in accord with the spirit of the times; that a considerable percentage of business men, as well as manufacturers and others, resist the idea as being unnecessary and impracticable. The old adage "Every man for himself and the devil take the hindermost," is distinctly antagonistic to the theory of cooperation. However this may be, the lack of cooperation is apparent everywhere; not only do we suffer in business, but in our private affairs, in politics and even in the churches and religion.

If, however, there is set forth one idea of value in such a theory that one idea should be reduced to practice, for the time has come when we should get together and adopt ideas which will assist in maintaining the textile industry in its position among well organized, substantial and reliable industries of the country.

You cannot expect to remove all the "sore spots" in business by cooperation, but you can certainly eliminate some of them, and manufacturers must be made to realize the importance of a stronger and more far-reaching combination for mutual protection and education than has, as far as I know, yet been attempted. Let us be prepared to act if it becomes necessary, as a vast and powerful unit, a unit for good, and not be contented each one to pipe alone from his own corner, our voices sounding like the cry of children in the wilderness, forsaken and disheartened.

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SPINNING VALUES OF DIFFERENT GRADES OF COTTON

By GEORGE W. NEVILLE, President New York Cotton Exchange, 82 Beaver St., New York, N. Y.

A paper read at the meeting of the National Association of Cotton Manufacturers

There is no single factor connected with the marketing of the cotton crop, with the varied assorment of grades in it, which the merchant has to buy from the farmer, so as to select the even running grades which the spinner requires for his sale of goods, that occasions so much discussion and interferes so greatly with the satisfactory distribution of the cotton crop of the United States by the cotton merchant, as the differences in value of the cotton above and below middling.

It is not necessary to state to you the variety and the uncertain proportions in quantity of the grades which the weather conditions of succeeding seasons enable the farmer to produce. One season may be favorable throughout and result in a normal crop with a very small proportion of grades below Middling; the following season may be abnormal in the extreme and the quality produced may be largely of the grades below Middling. The cotton merchant, in order to supply you manufacturers with the quality you need to enable you to produce and sell your manufactured goods, as the demand appears, must face all this uncertainty, and at the same time has to protect himself against price fluctuations on every contract he makes with you, either by purchasing the actual cotton in the South or by purchasing a contract for the future delivery of cotton on some Exchange where such contracts are traded in.

The Rules and By-Laws of a Cotton Exchange, if this institution is to perform its proper functions to the cotton trade, have to be such as will take care of all the merchantable and spinnable

cotton weather conditions enable the farmer to produce. The Cotton Exchanges where such contracts are traded in, viz: Liverpool, New Orleans and New York, have a range of full grades delivered against a sale for future delivery, as follows:

Fair,
Good Middling,
Middling,
Low Middling,
Good Ordinary.

There are sub-divisions of these full grades known to the cotton trade as half and quarter grades. The half grades are designated in the United States by the prefix "strict," and the quarter grades by the prefix "Fully" and or "Barley." These sub-divisions are necessary so that the Southern cotton producer may obtain the true value of every bale of his cotton, some of which may not be good enough for one of the full grades and would be too good for the next lower full grade. In addition, there are certain tinged and stained grades which are accepted as a delivery.

The Cotton Exchange, as a business institution, is the evolution of the cotton trading as practiced in the middle of the last century, and when first established was intended wholly for the cotton merchants; but with the increase in demand for cotton goods and the increase of the cotton crop in this country, its facilities were broadened until today there is not a cotton manufacturer who either directly or indirectly does not avail himself of its use.

When first organized all the Cotton Exchanges in determining the values of the different grades of cotton for delivery purposes, used the so-called "Commercial Differences," i. e., the differences in price which the various grades above and below Middling were actually fetching in the markets daily; the prices being determined in fact by the offers and acceptances of merchants. The New York Cotton Exchange was the first to discover the possibilities of manipulation involved in this system and the consequent harm to merchants. It found that the entire contract market was being continually manipulated month by month, and that merchants who had purchased large lines of cotton in the Sopth, of assorted grades, were finding their sales of contracts as hedges against their purchases, affected injuriously to them by the manipulation of these so-called "Commercial Differences," and of the price of contracts thereby. After a heated discussion culminating in 1897, this system of differences was changed by the New York Cotton Exchange to the two revisions or changes in these differences each cotton season, one in September and the other in November. The New York Cotton Exchange found this method answered all purposes admirably until the low grade crop of 1906-07, which proved to be the lowest grade crop ever produced in this country. Much disturbance necessarily followed in all contract markets and great dissatisfaction was expressed by the cotton merchants and spinners of the country, their criticism being directed particularly against the New York Cotton Exchange in spite of the theory and experience that the difference between the basis Middling contract price and the price of Middling even running will not invariably rule at a uniform amount, and in the nature of the business cannot do so, even with the most drastic daily revisions of the grade differences. The reason for this is that the Basis Middling contract price represents constant trading in the range of grades deliverable, with which all who use the facilities of the Exchanges are familiar, and the wide disparity between the Basis Middling price and the even running Middling price is caused by the scarcity of that particular grade or higher grades, due to a low grade production by the farmers. The Liverpool market is the greatest of those having the daily revisions. The difference between even running Middling on the spot and the price of their Basis Middling contract on the 15th inst. was 26 Liverpool points or 52 points our currency, and the difference in New York on the same date was 50 points.

At the request of your organization and of The American Cotton Manufacturers' Association, committees from your spinning organizations met committees from the New Orleans and New York Cotton Exchanges to consider certain complaints and recommendations which your joint committee presented. After a prolonged discussion, the following was agreed on by all parties to the conference:

1st. The New York Cotton Exchange should have another revision in February of each year, making three each season.

2d. The adoption of the Government standards when made of Upland cotton.

3d. The New York Cotton Exchange to issue certificates of classification for single bale certificates, if it could be done without too much expense.

The first has been complied with and was effective last February.

The second could not be done owing to conditions the New York Cotton Exchange could not control, although the resolution was presented to the proper parties, as passed by the conference above referred to.

The third has not been done as warehouse labor cost was found to be prohibitive, but the method of issuing the grade certificates has been changed from that ruling before the conference, which all agree was for the better.

The meager tests made by the New York Cotton Exchange to demonstrate the practicability of applying this method of differences for determining the prices at which grades above and below Middling should be delivered on contract of sale of a Basis Middling contract for the future delivery of cotton, also clearly demonstrated the spinning value of Good Ordinary, the lowest grade deliverable on a contract of sale for the future delivery of cotton, and many manufacturers to whom these yarns and results have been shown here expressed their surprise and stated they have since been using these low grades and the results are very satisfactory.

In this connection, it seems to a large number of the cotton merchants that cotton manufacturers could cheapen the cost of their raw material greatly, by purchasing the lower grades at the discounts prevailing, even when the average grade of the crop is normal; and when the grade of the crop happens to be abnormally low, these lower grades could be economically bought and used to great advantage; particularly is this the case when the yarns are dyed or the cloths printed.

Personals

Dexter Stevens, now employed as superintendent of spinning with the Lancaster Mills at Clinton, Mass., will sever his connection with that concern on or about June 1st next to take a position with the Necronset Mills of Cumberland, N. C., as vice-president and general manager.

E. E. Grant has accepted the position of overseer of weaving at the Canadian Cotton Co., Ltd., Cornwall, Ont., Canada. He comes from Fall River, Mass.

Charles B. Weeden, formerly second hand of spinning at the Bridgewater Woolen Co., Bridgewater, Vt., has been promoted to the position of overseer of spinning to succeed Lawrence J. Carroll.

W. Keonick, overseer of dressing at the Rockville Worsted Co., Rockville, Conn., has severed his connection with that company.

Victor Thewlis, superintendent of the Tilton Mills, Tilton, N. H., has accepted the position of general manager of the Bradford Mill, John & James Dobson, Germantown, Philadelphia, Pa.

Lewis Irons has accepted the position of overseer of weaving at the Thomas Oakes & Company, Bloomfield, N. J. He was formerly employed at the Stanley Woolen Co., Uxbridge, Mass.

Frank Lawson, who has been second hand in the finishing room at the Livingston Worsted Co., Washington, R. I., has been appointed overseer of that department to succeed Charles North.

Joseph Decelles, overseer of spinning at the Renfrew Manufacturing Co., Adams, Mass., who has been in their employ for the past twenty-three years, has severed his connection with that company to take up farming.

John Stafford has been chosen president of the Cornell Mill, Fall River, Mass., to succeed the late Stephen A. Jenks.

William A. Pedler has been appointed superintendent of the cotton department of the Arlington Mills, Lawrence, Mass., to fill the position made vacant by the promotion of Alfred Sagar to the position of agent.

C. R. Upchurch has accepted the position of overseer of carding and spinning at the New Harriet Mills, No. 3, Henderson, N. C. He was formerly employed at the Louise Mill, Charlotte, N. C.

C. N. Harper has been promoted from overseer of weaving to superintendent of the Pomona Mills, Greensboro, N. C.

Olin Johnson has accepted the position of overseer of dyeing at the Highland Park Mill, Rock Hill, S. C., succeeding C. C. Miller. He comes from Wilmington, N. C., where he was employed at the Delgado Mill.

W. T. Howard has accepted the position of overseer of weaving at the Glen Lowry Mill, Whitmire, S. C. He comes from Greenwood, S. C.

W. M. Abernathy has accepted the position of overseer of spinning, spooling and twisting at the Cherryville Mfg. Co., Cherryville, N. C. He comes from Bessemer City, N. C.

P. E. Adams has accepted the position of overseer of spinning at the Lorraine Mills, West Point, Miss. He formerly held a similar position at the Statesville Cotton Mills, Statesville, N. C.

H. C. Dresser has been appointed superintendent of the Martel Mill, Atlanta, Ga. He formerly held a similar position with the Oconee Mills, Westminster, S. C.

J. T. Redmon has accepted the position of overseer of carding at the Dixie Mills, Mooresville, N. C. He comes from Danville, Va.

J. T. Alexander has accepted the position of overseer of spinning in Mill No. 1 at Roanoke Rapids, N. C. He comes from Knoxville, Tenn.

Harry Metcalf has accepted the position of overseer of dyeing at the Lowell Thread Mills, John C. Meyer & Co., Lowell, Mass. He comes from Lawrence, Mass.

A. W. Jackson, overseer of weaving at the Danielson Cotton Co., Danielson, Conn., has severed his connection with that company.

Joseph D. Price has accepted the position of overseer of dyeing at the Amos, Abbott Co., Dexter, Me. He comes from Gilsum, N. H.

Robert Logan has been appointed overseer of weaving at the Shetucket Co., Norwich, Conn. He comes from Wilkinsonville, Mass.

E. N. Wolfe has accepted the position of overseer of beaming, slashing, spooling and warping at the Shetucket Co., Norwich, Conn., succeeding George H. Rhodes.

George Walsh, overseer of weaving at the Shetucket Co., Norwich, Conn., has severed his connection with that company to accept a similar position at Danielson, Conn.

Charles Gledhill has accepted the position of overseer of finishing at Fairbanks & Dorr, Guild, N. H. He comes from Tilton, N. H.

John Elliott has been appointed overseer of carding at the Indian Spring Mill, American Woolen Co., Madison, Me. He comes from Old Town, Me.

John Gledhill has accepted the position of overseer of finishing at the Tilton Mills, Tilton, N. H. He was formerly employed at the Ounegan Mill, American Woolen Co., Old Town, Me.

John B. Benson, for twenty-three years overseer of weaving at the Hope Webbing Co., Paw-

tucket, R. I., has severed his connection with that company. On his retirement Mr. Benson was presented with a gold lined silver loving cup and a purse of gold, the gifts of employes in the mill. He was also presented with a check, the gift of the corporation, and another check, the gift of the employes of the office. Frederick Lafayette, employed as overseer of sections A and B, was advanced to the position vacated by Mr. Benson, and John Lord, formerly second hand in sections A and B, was appointed overseer of those sections.

John H. Prescott, formerly of the Dunham Hosiery Co., and later of the Kingston Hosiery Co., Kingston, Ont., Canada, has resigned his position as overseer of knitting, to accept a position with the Allentown Eiderdown Co., Allentown, Pa.

Andrew Van der Does has accepted the position of overseer of wet finishing at the Greenblatt Textile Manufacturing Co., Reynoldsville, Pa. He comes from Paterson, N. J.

Charles M. Hurst, for the past thirty years overseer of the finishing department at the Atlantic Mills, Providence, R. I., has severed his connection with that company. He will retire from the textile business.

J. M. Gamewell has been appointed superintendent of the Wylie Mill, Chester, S. C. He formerly held a similar position with the Courtenay Manufacturing Co., Newry, S. C.

J. E. Wicker has been appointed general manager of the Holt-Granite Mills, Haw River, N. C. He formerly held the position of superintendent of the Patterson and the Roanoke Mills, Roanoke Rapids, N. C.

G. L. Harwell has accepted the position of overseer of spinning at the Catawba Mill, Newton, N. C.

P. M. Miller has accepted the position of overseer of spinning and winding at the Atlanta Woolen Mill, Atlanta, Ga. He was formerly employed at the Payne Mill, Macon, Ga.

W. C. Cessna has accepted the position of night overseer of carding and spinning at the California Cotton Mills, Oakland, Cal. He comes from Columbus, Ga.

J. W. Pierson, overseer of spinning at the Avondale Mills, Birmingham, Ala., has resigned to accept the position of superintendent of the Valley Creek Mills, Selma, Ala.

W. M. Hoffman, overseer of carding at the Rhode Island Mill, Spray, N. C., has resigned to accept a similar position at Lumberton, N. C.

Charles Ratcliffe has accepted the position of overseer of spinning at the Lincoln Mill, Evansville, Ind.

J. C. Waters has accepted the position of overseer of carding at the Chinnabee Mills, Talladega, Ala. He comes from Knoxville, Tenn.

James Miller has been promoted from overseer of spinning to the position of superintendent of the Armon Manufacturing Co., Mountain Island, N. C., to succeed H. C. Moore.

M. C. Dawkins has accepted the position of overseer of carding at the Hermitage Mills, Camden, S. C.

Silas M. Wheelock, treasurer of the Putnam Woolen Co., Putnam, Conn., Arthur Wheelock, president and treasurer of the Stanley Woolen Co., Uxbridge, Mass., and C. A. Root, agent and manager of the Uxbridge Worsted Co., Uxbridge, Mass., have sailed for England. They intend to visit England, France and Germany to study manufacturing conditions in Europe.

William H. Bagley, for the past two years agent of the Saranac Mill, American Woolen Co., Blackstone, Mass., has severed his connection with that company and is succeeded by Augustine H. Eddy. Mr. Eddy was formerly agent of this mill but a few years ago organized the Nasonville Woolen Co.

H. Lagasse has accepted the position of overseer of ring spinning at the Dominion Textile Co.'s mill at Magog, P. Q., Canada. He comes from Fall River, Mass.

C. Van Hauweghem has accepted the position of overseer of spinning at the Yale Woolen Mill, Yale, Mich. He was formerly employed at the Hewson Woolen Mills, Amherst, N. S., Canada.

Samuel Fox has accepted the position of overseer of carding at the St. Anne's Mill of the Dominion Textile Co., Montreal, Canada. He was formerly employed at the Bates Mfg. Co., Lewiston, Me.

Frederick Deverell has been appointed overseer of weaving at the Nos. 2 and 4 mills of the National & Providence plant of the American Woolen Co., Providence, R. I.

Walter S. Briggs, formerly connected with the Boston office of the New England Cotton Yarn Co., has resigned to accept a position as salesman for Joseph B. Jameson, Boston, Mass., in the cotton yarn business.

Joseph Baudry, overseer of weaving at the National & Providence plant of the American Woolen Co., Providence, R. I., has severed his connection with that company.

Walter A. Scott has accepted the position of overseer of finishing at the Allen Woolen Mills, Rochester, N. Y. He was formerly employed at the Harris, Emery Co., Penacook, N. H.

Frank Stiner, overseer of finishing at the Allen Woolen Mills, Rochester, N. Y., has severed his connection with that company.

Russell K. Boadwee has been appointed general manager of the Crown Silk Manufacturing Co., Bangor, Pa. He was formerly superintendent of the Thomas Iron Co., Hokendaqua, Pa.

George W. Hall, formerly purchasing agent for the Lawrence Dye Works, Lawrence, Mass., and Philip Jameson have entered the employ of Joseph B. Jameson of Boston, Mass., as salesman in the yarn department.

Walter D. West has been appointed agent of the Baltic Mill, American Woolen Co., Enfield, N. H., succeeding Thomas F. Crowe.

Obediah Butler has been appointed secretary and general manager of the Canadian Connecticut Cotton Mills, Ltd., Sherbrooke, P. Q., Canada. He formerly held the position of superintendent of the Bristol Manufacturing Co., New Bedford, Mass.

Frank L. Parker, superintendent of the Peerless Woolen Mill, Rossville, Ga., for a number of years, has severed his connection with that company.

C. Laseter has accepted the position of superintendent of the Bibb Manufacturing Co., Macon, Ga. He formerly held a similar position with the Payne Mills, at Macon.

C. E. Wilkes, secretary and treasurer of the Statesville Cotton Mills, Statesville, N. C., has resigned to accept a similar position with the Lorraine Mills, West Point, Miss.

J. H. Huff has accepted the position of overseer of spinning at the Willingham Mill, Macon, Ga. He was formerly employed at the Ide Cotton Mill, Jacksonville, Ala.

T. F. King has accepted the position of overseer of carding at the Martel Mills, Egan, Ga.

Burt Morgan has accepted the position of overseer of weaving at the Elmira Mills, Burlington, N. C. He comes from Danville, Va.

W. A. Brooks has accepted the position of overseer of spinning at the Liberty Cotton Mills, Liberty, S. C.

Edward B. Kelly, treasurer and sales manager of the Mechanical Fabric Co., Providence, R. I., died at his home in Brookline, Mass., May 13, after a five days' illness of pneumonia. He was born in Canton, N. Y., and received his early education in that city. Soon after he entered the employ of the Stedman & Fuller Co., card clothing manufacturers, at Lawrence, Mass. When the Mechanical Fabric Co. was started in 1890 he took the position which he occupied until the time of his death. A wife survives him.

Adolph Felsentraeger, for several years overseer of the wet and dry finishing at the Germania Mills, Holyoke, Mass., has resigned.

Arthur S. Medley has been appointed manager of the Somerset Mill of John and James Dobson, 8th and Somerset Sts., Philadelphia, Pa., succeeding Donald C. Blackwood.

John A. Fernley, superintendent of the Butler Mill, New Bedford, Mass., has accepted the position as superintendent of the Dartmouth Manufacturing Corporation, of that city, to succeed Obadiah Butler.

James P. Ryan has accepted the position of overseer of finishing at the Rochdale Mill, American Woolen Co., Rochdale, Mass., succeeding Frank Talcott.

It is reported that James A. Adams, superintendent of the weaving department at the Whitman Mill, New Bedford, Mass., has succeeded John A. Fernley as superintendent of the Butler Mill of that city.

Ernest J. Geissler has resigned as superintendent of the spinning department at the Broad Brook Co., Broad Brook, Conn. He has been in their employ for thirty-one years and will retire from active work.

William Henry, overseer of carding at the Dartmouth Manufacturing Corporation, New Bedford, Mass., has been appointed superintendent of the carding department at this mill.

John Millett has accepted the position of overseer of weaving at the Somerset Woolen Co., Monson, Mass.

Benjamin Sprowson has accepted the position of overseer of carding at the Globe Yarn Mills, Fall River, Mass. He comes from Fitchburg, Mass.

Stephen D. Bennett, superintendent of G. H. Tilton & Sons Cotton Mill at Savannah, Ga., has severed his connection with that company.

John Harrison has accepted the position of overseer of carding at the Versailles Sanitary Fibre Mills, Versailles, Conn. He comes from West Orange, N. J., and succeeds Ben Holden.

Samuel Diggle has accepted the position of overseer of bleaching at the Empire Cotton Mills Co., Welland, Ont., Canada.

Hugh B. Fraser has accepted the position of overseer of finishing and dyeing at the Lawrence, Webster Co., Malone, N. Y. He comes from Franklin, Mass.

Frank Henries has accepted the position of overseer of finishing at the Huntington Manufacturing Co., Huntington, Mass. He was formerly employed at the Hoosac Worsted Mill, North Adams, Mass.

James Dixon has accepted the position of assistant designer at the New York Mills, New York Mills, N. Y. He was formerly employed at the Hewson Pure Wool Textile Ltd., Amherst, N. S., Canada.

F. S. DuPree, formerly manager of the Wylie Manufacturing Co., Chester, S. C., has accepted a position in the main office of the Parker Cotton Mills, Greenville, S. C.

J. W. Billings has acepted the position of overseer of carding at the Johnston Manufacturing Co., North Charlotte, N. C. He comes from Monroe, N. C.

B. V. Searle, assistant superintendent of the woolen department of S. Slater & Son, Inc., Webster, Mass., has resigned to accept the position of superintendent of the yarn department at the Bigelow Carpet Co., Lowell, Mass.

William Heaney, for the past twenty-five years overseer of cone winding at the Globe Yarn Mill, N. E. Cotton Yarn Co., Fall River, Mass., has severed his connection with that company. He was presented with a gold watch by the help employed in this department.

S. B. Shipp has been appointed superintendent of the Wilson Cotton Mill, Wilson, N. C., succeeding E. A. Holt. He comes from Columbia, S. C.

T. R. Hazel, overseer of spinning at the Olympia Mills, Columbia, S. C., has resigned to accept the position of superintendent of the Richlands Mill, at Columbia, S. C.

George H. Riddle, overseer of weaving and assistant superintendent of the Patterson Mills, Roanoke Rapids, N. C., has resigned to accept the position of superintendent of the Inverness Mills, Winston-Salem, N. C.

B. C. Crawford has accepted the position of overseer of weaving at the Great Falls Manufacturing Co., Rockingham, N. C. He comes from Alexander City, Ala.

P. W. Pollard has accepted the position of overseer of spinning at the Simpsonville Cotton Mills, Simpsonville, S. C. He comes from Greenville, S. C.

C. H. Hillman has accepted the position of overseer of spinning, twisting, etc., at the Wilson Cotton Mill, Wilson, N. C. He was formerly employed at the Eureka Mill, Chester, S. C.

M. C. Ewing, overseer of spinning at the Peck Manufacturing Co., Warrenton, N. C., has resigned to accept a similar position at the Patterson Mills, Roanoke Rapids, N. C.

W. B. Holt has been appointed superintendent of the Columbia Cotton Mills, Columbia, Tenn.

W. R. Graham has accepted the position of overseer of weaving at the Tarboro Cotton Factory, Tarboro, N. C. He comes from West Durham, N. C.

T. A. Marshall has accepted the position of overseer of weaving at the Ware Shoals Manufacturing Co., Ware Shoals, S. C. He comes from Brookford, N. C.

J. H. Stillwell has accepted the position of overseer of spinning at the Atlas Mills, Bessemer City, N. C. He was formerly employed at the Sevier Mill, Kings Mountain, N. C.

W. H. Harrison, overseer of weaving at the Tarboro Cotton Factory, Tarboro, N. C., has resigned to accept a similar position in the Draper department at the Roanoke Mill Co., Roanoke Rapids, N. C.

Auguste H. Jean, for the past thirty-eight years connected with the Lawrence Manufacturing Co., Lowell, Mass., as an overseer, died at his home in that city after a short illness. The deceased was forced to leave work a few weeks ago, but after a few days' rest he returned to his duties and was working a few days when he was stricken and died within a very short time. He was born at Kakouna, P. Q., Canada, April 24, 1848, and is survived by a wife and six children.

Fred W. Towle, for the past twenty-two years engineer at the Mascoma Mill, American Woolen Co., Lebanon, N. H., has severed his connection with that company to accept a similar position at Claremont, N. H.

Peter Hoole, for a number of years overseer of finishing at the Cohannet Mill, Taunton, Mass., has resigned to accept a position as superintendent of a large cotton mill in North Carolina.

Frank W. Allen has been appointed manager of the James Simpson Silk Mill at South Scranton, Pa.

Frank Ricker has been appointed overseer of carding at Fairbanks & Dorr's mill at Guild, N. H. He comes from the Tilton Mills, Tilton, N. H.

William Blake has been promoted to the position of overseer of carding at the Tilton Mill, Tilton, N. H. He was formerly second hand at that mill.

C. M. Klebart has accepted the position of overseer of weaving at the Stanley Woolen Co., Uxbridge, Mass. He was formerly employed at the Lewisburg Woolen Co., Lewisburg, Pa.

Eugene J. Bourque has accepted the position of general second hand of the carding and spinning at the National Knitting Co., Milwaukee, Wis. He was formerly employed at the Fabyan Woolen Co., Medway, Mass.

E. C. Russell has accepted the position of second hand in the finishing department at the Peace Dale Manufacturing Co., Peace Dale, R. I. He was formerly employed at the Huntington Manufacturing Co., Huntington, Mass.

H. F. Goff has accepted the position of overseer of spinning at the Falls Co., Norwich, Conn. He was formerly employed at the Boott Mill, Lowell, Mass.

Patrick F. Doyle has been appointed overseer of finishing at the Darling Woolen Co., Holliston, Mass. He formerly held a similar position with the Premier Worsted Mill, Bridgeton, R. I.

Frank Stiner, overseer of finishing at the Allen Woolen Co., Rochester, N. Y., has severed his connection with that company.

L. J. Gruber has been appointed superintendent of the Lewisburg Woolen Co., Lewisburg, Pa. He was formerly employed at the Brickner Woolen Co., Sheboygan Falls, Wis.

J. Price Morris has accepted the position of designer at the Lymansville Co., Lymansville, R. I. He was formerly employed at the Waterhouse & Howard Mill, North Adams, Mass.

Michael McKearn has accepted the position of overseer of carding at the Locustville Woolen Co., Hope Valley, R. I.

John McKeon has been appointed overseer of weaving at the Queen City Cotton Co., Burlington, Vt. He was formerly employed at the Atlantic Mills, Lawrence, Mass.

Alexander A. Dawson has accepted the position of general second hand of carding at the Auburn Woolen Co., Auburn, N. Y. He was formerly employed at the Wellesley Knitting Mills, Newton Lower Falls, Mass.

Courtland C. Earle has accepted the position of overseer of carding at the Hebron Manufacturing Co., Hebronville, Mass.

Thomas H. Conley has been appointed superintendent of the yarn department at the Lancaster Mill, Clinton, Mass., succeeding Dexter Stevens. Mr. Conley comes from New York Mills, N. Y.

W. H. King, for forty years overseer of weaving at the Bigelow Carpet Co., Clinton, Mass., has severed his connection with that company.

A. P. Foster has accepted the position of overseer of spinning at the Pawcatuck Woolen Co., Potter Hill, R. I. He was formerly employed for the Davis & Furber Co., at North Andover, Mass., in the erecting department.

Charles H. Blackburn, for the past six years overseer of spinning at the Pawcatuck Woolen Co., Potter Hill, R. I., has resigned.

Colonel Edward W. Rogers, president of the Lockport Cotton Batting Co., Lockport, N. Y., died Saturday, May 10.

E. H. Pierce, overseer of weaving at the Globe Mill, Manville Co., Woonsocket, R. I., has severed his connection with that company. He is succeeded by Samuel Gaull.

Fred Willby has accepted the position of overseer of dyeing at the Bellevue Mill, Clinton, Mass. He comes from Bridgton, Me.

Alexander F. Hobbs, resident manager of the Silver Spring branch of the U. S. Finishing Co., Providence, R. I., has resigned and is succeeded by James Bryce, who comes from Passaic, N. J.

William Henry, for the past four years overseer of carding at the No. 3 Mill of the Dartmouth Manufacturing Corporation, New Bedford, Mass., has been appointed superintendent of all of the carding of the corporation.

John A. Fernley, for the past ten years superintendent of the Butler Mill, New Bedford, Mass., has severed his connection with that company.

Frederick E. Cunneen, for the past seven years superintendent of the Seaconnet Mill, Fall River, Mass., has severed his connection with that company to accept a similar position with the Cohannet Mill of Taunton, Mass.

J. D. Wadkins has been promoted to overseer of spinning at the Athens Manufacturing Co., Athens, Ga., succeeding L. T. Sanford.

B. L. Ledwell, superintendent of the Knoxville Spinning Co., Knoxville, Tenn., has severed his connection with that company.

DEATHS.

Lyman Rhodes Hopkins, the first president of the American Thread Co., with large mills at Willimantic, Conn., died at the home of his granddaughter, Mrs. Benjamin T. Peck, 87 Arnold Ave., Edgewood, R. I., the cause of his death being old age. He had been out of the cotton business for many years. He retired as president of the American Thread Co. in 1902 and had been a director of the Norfolk & New Brunswick Hosiery Co., New Brunswick, N. J., also a director of several banks and other business enterprises.

John A. Bennett, who resigned his position as agent and superintendent of the Hamlet Mill, Woonsocket, R. I., about ten years ago, and who, previously to that time, was connected with a number of large mills in the New England states, died at his home in North Scituate, R. I., at the age of 85 years.

E. A. Dubose, secretary and general manager of the Waxahachie Cotton Mills, Waxahachie, Texas, died at his home in that city at the age of 71 years. He was also president of the Texas Cotton Manufacturers' Association and was elected Mayor of that city, serving several terms.

William A. Trask, for twenty-six years with the Chace Cotton Mill, Burlington, Vt., died at his home, after an illness of six weeks, of a complication of diseases, at the age of 71 years. He was actively engaged until a few weeks before his death. A wife and six children survive him.

William W. Burson, inventor of the Burson and Nelson hosiery machines, died at Rockford, Ill., April 10, at the age of 80 years. He was born in Vernango County, Pa., and moved to Rockford in 1860. He organized the present Burson Co. and is survived by a wife, two sons and one daughter.

Frederick G. Robinson, well known in the knit goods trade as a manufacturer, died at his home in New Brunswick, N. J., at the age of 80 years. He was the second oldest member of the Manhattan Lodge of Masons and was born in Hinckley, Eng.

Alfred Tomlin, president of the American Knitting Co., Waltham, Mass., pioneer manufacturer of woolen sweaters, died at his home in that city at the age of 72 years. He is survived by a wife and three children.

Fred L. Means, for the last twelve years master mechanic at the Pepperell Manufacturing Co., Biddeford, Me., was instantly killed by a granite window cap, which he was assisting in removing from its position over a window in No. 3 mill. He was 48 years of age and is survived by a widow and one daughter.

James Mitchell, a member of the firm of Katterman & Mitchell, silk manufacturers of Paterson, N. J., was instantly killed May 4 in an automobile accident. He was 47 years of age and is survived by a wife and a daughter.

James Harkness Bowman died at his home in Paterson, N. J., in his sixty-fourth year. Mr. Bowman had retired from business several years ago, having been in the silk business in that city. He leaves two sons and one daughter.

Charles J. Hayes, for a number of years prominently known among silk manufacturers, died at his home in New York City, from a complication of diseases at the age of 58 years. He was unmarried and was the son of Edward Hayes, a well known English marine artist. Mr. Hayes was a noted expert in the manufacture of silks.

Harry B. Harley, president and treasurer of the Barnaby Manufacturing Co., Fall River, Mass., died at his home in that city at the age of 36 years. He was the son of the late James B. Harley, who, for a number of years, was general manager of the American Print Works in that city. He is survived by a widow, two brothers and one sister.

Mill News

Those interested in receiving early and more complete investigated information of projected new mills, enlargements, improvements, fires, facts and gossip of the trade are referred to the TEXTILE ADVANCE NEWS, issued weekly by the publishers of the TEXTILE WORLD RECORD, at $15.00 per year. Communications for this department are invited. There is no charge made for printing notices of new mills, enlargements, improvements, etc.

COTTON.

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New Mills.

*Alabama, Sylacauga. The new Eva Jane Mill being built by the Avondale Mills of Birmingham, is rising rapidly and will be ready for the installation of machinery in August, according to J. McD. Comer, the secretary of the Avondale Mills. The main building is 450 ft. long, 150 ft. wide, and will be 4 stories high. It will be equipped with 40,000 spindles and 1,200 looms to make white and colored goods from coarse yarns.

*Canada, Quebec, Sherbrooke. A report from Sherbrooke states that the new Canadian Connecticut Cotton Mills, Ltd., recently organized by the Connecticut Mills Company of Danielson, Conn., associated with Canadian interests, will manufacture tire duck exclusively. The Connecticut Mills Company sells tire duck to most of the principal tire manufacturers in the United States and as nearly all the Canadian tire concerns are subsidiary companies of the American tire concerns, the new cotton mill will from the outset have its brands well known to the trade. Arrangements are now being made for the construction of buildings and it is hoped to begin manufacturing about Jan. 1, 1914. The new company has authorized capital stock of $1,750,000. H. L. Burrage is president; R. J. Caldwell, vice-president, and Tracy S. Lewis, treasurer and buyer. Mr. Lewis' address is Beacon Falls, Conn.

*Illinois, Quincy. The Chamber of Commerce is more hopeful that its efforts to bring about the building of the projected cotton mill will be successful. They advise that the project is likely to go through. In December the Quincy Cotton Mills was incorporated with capital stock of $300,000. L. E. Barnes, at one time agent of the Pemberton Company and Methuen Company at Lawrence and Methuen, Mass., is one of the promotors and agreed to take part of the common stock, the Chamber of Commerce agreeing to raise subscriptions for $200,000 worth of bonds and $50,000 common stock. Plans for a 3-story mill were made to be equipped for the manufacture of denims and coarse goods.

*North Carolina, Charlotte. The Thrift Mfg. Company, which was organized some time ago to succeed the Thayer Mfg. Company, has elected the following officers: E. A. Smith, president; John M. Miller, Jr., vice-president; George B. Hiss, treasurer; and Robert G. Lassiter, secretary. The capital stock has been increased from $500,000 to $600,000 and classified as $400,000 common stock and $200,000 preferred stock. As noted in a previous report the Thrift Mfg. Company took over the partially completed plant of the Thayer Mfg. Company and is making some changes from the original plans, equipping it to manufacture coarser goods.

*North Carolina, High Point. Good progress is being made on the hosiery yarn plant under construction for the Highland Cotton Mills, Inc. The main building is 390 by 125 ft., of reinforced concrete construction. Other buildings being erected are an office building and a warehouse. The capital stock of this company, which will manufacture 10s to 20s hosiery yarns, chiefly for the Piedmont Mills Company and the High Point Hosiery Mills, is $250,000. Electric power equipment, 12,000 ring spindles, and preparatory machinery will be installed. The officers are J. H. Adams, president and buyer; J. E. Millis, treasurer; and L. R. Gilbert, superintendent. Mr. Adams is president of the Piedmont Mills Company and treasurer of the High Point Hosiery Mills. Mr. Millis is president of the High Point Hosiery Mills and treasurer of the Piedmont Mills Company.

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Enlargements and Improvements.

Connecticut, Danielson. Some new equipment is being installed in the cloth room of the Quinebaug Company. Additions are also being made in the spinning department.

North Carolina, Raeford. The Raeford Power & Mfg. Company will develop 500 h. p. on Rock Fish Creek, several miles below Raeford. When this development is completed the cotton mill of the company will be changed from steam to electric power.

Delaware, Wilmington. Bids are being asked by Joseph Bancroft & Sons Co., manufacturers of hollands, book cloths, etc., on plans which have been prepared for them for a 5-story brick and concrete building, 60 by 100 ft., to be erected as an addition to their present plant.

Georgia, Columbus. Two thousand additional spindles have been ordered by the Muscogee Mfg. Company and will be installed within 90 days. This is additional equipment and will not be used to replace old machinery.

Georgia, West Point. The Lang Mfg. Company will change from steam to electric power and has contracted for electricity from the lines of the Columbus Power Company.

Maryland, Ilchester. The installation of electric motors in the weaving department of the Thistle Mills, Inc., has been completed. Some other improvements also have been made during the past month. Cotton duck and belting is manufactured.

*Massachusetts, Chicopee. Work has been started on tearing down No. 3 mill of the Dwight Mfg. Company. As noted some time ago this mill is to be replaced with a modern mill building of

the same height as the old mill and of the same general dimensions, although somewhat narrower. It is expected that the old mill will be completely razed in about three weeks. The rebuilding of mill No. 2 will be finished in the near future. These changes are part of a scheme of extensive additions and improvements to the plant which will mean eventually the replacing of all the old mills with modern up-to-date buildings.

*Massachusetts, Fall River. The improvements being made at No. 7 mill of the Fall River Iron Works Company comprise the installation of 1,050 new automatic looms to replace old narrow looms. There will be no other changes.

North Carolina, East Durham. A large new dye house is to be built at the East Durham plant of the Durham Cotton Mfg. Company. Construction work will be started in a few days and the company hopes it will be completed within the next 90 days. The new building will be 78 by 132 ft., and is being built in place of the old dye house simply to give more room. It will be equipped to handle both raw stock and yarns as heretofore.

North Carolina, Gastonia. The Clara Mfg. Co. will add new electrical equipment to its mills consisting of five 20 h. p. and one 50 h. p. motors, two 125 kv-a. transformers, switchboard and accessories. The apparatus has been ordered from the General Electric Company.

North Carolina, Kannapolis. Ground has been broken for an addition to the weave room of the Cannon Mfg. Company, which will be 120 ft. long.

*North Carolina, Lexington. The new 3-story-and-basement addition to the Dacotah Cotton Mills, which is under construction, will have 4,800 spindles and 150 looms when completed, and will increase the equipment to 15,360 ring spindles and 520 looms. New electric motors were recently purchased for the new addition.

North Carolina, Lexington. Twelve new spinning frames and four new roving frames are being installed in the plant of the Wennonah Cotton Mills Company replacing old machinery which is being thrown out. There are no other changes.

North Carolina, Newton. Within the last few weeks five new spinning frames have been installed in the Catawba Cotton Mills, giving them 1,120 additional spindles. Three new twisters are to be added. 30s and 40ss two ply yarns are manufactured in cones, tubes, skeins, ball and chain warps. John P. Yount is the manager and buyer.

North Carolina, Statesville. New spinning frames are being installed in the addition to the Paola Cotton Mills on which work was started several months ago.

Rhode Island, Crompton. Work has begun on the construction of a waste storehouse for the Crompton Company which will replace the structure burned some months ago. The building will be of brick, 43 by 188 ft., 1 story high. The work is being done by employes of the company.

*Rhode Island, Hope Valley. Twenty-six new looms will be installed in the addition to the weave shed of Joseph J. Taylor & Company, to weave fancy cotton and silk fabrics. This new equipment will be in operation in about ten days. William W. Taylor is superintendent and Joseph J. Taylor is buyer. The addition will give a total of 62 looms in the plant.

*Rhode Island, Hope Valley. An addition to the weave shed of Joseph J. Taylor & Company, manufacturers of cotton fabrics and double and twist yarns, has been completed. The enlargement is 54 by 54 ft., and looms will shortly be installed to weave fancy cotton fabrics.

Rhode Island, Pawtucket. The Dexter Yarn Co. will install additional electrical equipment in its mills consisting of a 100 k. w. alternator, seventeen motors ranging from 5 to 100 h. p., fourteen switches and switchboard apparatus. This new equipment has been ordered from the General Electric Company.

South Carolina, Anderson. Thirty-two new looms have been purchased by the Gluck Mills and will be operated on lawns, the regular line of the company. The new equipment will be delivered in July.

*South Carolina, Greenville. New machinery equipment is arriving at the Woodside Cotton Mills and being installed in the addition. A total of 27,000 spindles and 678 looms are being added and all this new equipment will be in operation before the end of September. Practically half a million dollars has been expended in the past year in enlarging and increasing this plant.

South Carolina, Inman. Some additional roving spindles are being added to the equipment of the Inman Mills, better to balance the equipment. No other changes are contemplated at present.

South Carolina, Lancaster. The Lancaster Cotton Mills have increased their capital stock from $1,000,000 to $2,500,000. Large additions have been under way for some time. Considerable new electric drive equipment from the General Electric Company will be placed in operation, including 285 motors ranging from 5 h. p. to 150 h. p.

*South Carolina, Yorkville. The Ancona Cotton Mills, recently incorporated with capital stock of $250,000 to take over and continue in operation the York Cotton Mills, recently purchased at bankruptcy sale by J. F. Cannon of Concord, N. C., and his father, J. W. Cannon, have elected officers as follows: J. W. Cannon, president; J. F. Cannon, secretary and treasurer. It is reported the plant is to be enlarged. At present there are 15,440 spindles and 160 looms making 40-in. sheetings.

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Mills Starting Up.

North Carolina, Mariposa. The Mariposa Cotton Mill, which has been idle for some time, has been sold at auction to R. H. Morrison, the former president, and associates. The new owners will install some new machinery and make extensive alterations and repairs before putting the plant in operation. It is expected the mill will be started up in September on 20 to 26 two-ply yarns.

*North Carolina, Salisbury. The Littmann Mills, Inc., manufacturers of mosquito netting and cotton novelties, have begun manufacturing. A building has been remodeled and 20 looms have been installed. Steam power will be used and the product will be piece dyed, bleached and finished. The authorized capital stock of this company is $50,000 of which $12,500 has been paid in. I. Littmann is president, treasurer and buyer and L. A. Henley is superintendent and manager.

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Mills Shutting Down.

Massachusetts, Fall River. The mills of the Fall River Iron Works Company will close indefinitely beginning next Monday. For three months the affiliated American Printing Company has been on a five-day schedule.

Mississippi, Batesville. The Panola Cordage Company has been taken over by M. E. Jarratt, trustee, who will sell the property. The plant is closed.

WOOLEN.

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New Mills.

*California, Long Beach. A temporary office has been established by the new California Woolens Mfg. Company in the offices of the Dutro-Wren Construction Company at the corner of First and Locust Sts. J. F. McAfee, vice-president of the company, is in charge. The California Woolens Mfg. Company was incorporated in March with authorized capital stock of $200,000 to establish a woolen mill at Long Beach. Really the new company is a reorganization of the Topeka Woolen Mfg. Company of Topeka, Kan., which closed its woolen mill some time ago and bought cloth in the market for its clothing manufacturing business. The Chamber of Commerce has voted favorably on the project and the supporters of the enterprise expect to place $30,000 worth of stock in Long Beach. Immediately after subscriptions for this amount of stock have been received the machinery, including three sets of cards and sixteen broad looms, will be brought from Topeka. S. J. Kent, formerly president of the Denver-Laramie & Northwestern Realty Company, is president of the new woolen mill and J. F. McAfee, formerly manager and general superintendent of the Topeka Company, is vice-president and acting secretary and treasurer.

*California, Richmond. Grading and excavating for the projected woolen mill which it is planned to erect in the northern part of the city on the lines of the Southern Pacific and the Santa Fe has been started and building material is expected to arrive in June. A spur track has been built to the site. The plans call for a main building, 3 stories high, of brick construction, 112 by 280 ft. Eventually five buildings will be put up, it is said by promoters. Earlier reports of this project have been given. It was noted in April that a company had been organized under the name of the Richmond Woolen Mill Company to build and operate a woolen mill and clothing factory and possibly a knitting plant in Richmond, and that a land development company had agreed to give a cash bonus and a free site provided an $85,000 mill were built. The promoters are understood to have opened an office at 417 Market St., San Francisco, under the name of the Richmond Woolen Mill Company.

*New York, Poughkeepsie. W. A. Lawrence Company, Inc., a new company reported incorporated last week, will manufacture knitted mesh fabrics and corset fabrics, in cotton, silk and mercerized, for the cutting up trade. Six flat knitting machines will be installed at 19 Main St. and manufacturing will begin about June 1. This company has capital stock of $20,000. William A. Lawrence, president of the Ideal Linen Mesh Company, Inc., of Poughkeepsie, is president of the new company. C. H. Townsend is treasurer, C. W. Lawrence, superintendent. W. A. Lawrence will attend to the buying. 2/26s and 2/40s combed and 2/26s and 2/30s mercerized bleached yarns will be used.

Pennsylvania, Philadelphia. Application has been made for a charter for the Jeeson Mfg. Company by William H. Jones, John Collier, Henry Evers, and John T. Collier. They have leased a part of the mill at 2nd and Columbia Aves., and are installing eight looms. On this initial equipment woolen, worsted and cotton dress goods and men's wear will be manufactured.

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Enlargements and Improvements.

*Indiana, La Porte. In addition to the recently reported improvements in the power department of the La Porte Woolen Mills, changes have been made in the yarn department increasing the capacity about 25 per cent., it is said.

Massachusetts Webster. The foundation is being put in for an addition to the card room of S. Slater & Sons plant in the South Village. The enlargement will be of brick construction, 50 by 120 ft., 1 story high, with saw tooth roof. The site for the storehouse which is to be erected to take the place of the storehouse recently destroyed by fire is being prepared for building.

New York, Malone. Two new fancy looms have just been installed in the Malone Woolen Mills, which makes a total of 18 looms. Business is very good at this plant and at the present time the company has enough orders to carry them well along into the fall. Theodore G. Beckert is superintendent and buyer.

New York, Oriskany. H. Waterbury & Sons Company, manufacturers of felts and blankets, are building a new engine room and will install a new steam engine. A voluntary increase in wages of 10 per cent. has been given employes.

Ohio, Ashtabula. The Ashtabula Worsted Company, which recently was reorganized and started up under the management of O. L. Suenderhauf, has received enough orders to warrant the increasing of their capacity and will install three sectional dressers, a cloth press and dewing machine.

*Pennsylvania, Philadelphia. The Saxonia Dress Goods Mills, now located at Howard and Palmer Sts., where they are manufacturing fancy dress goods and woolens on 150 looms, have purchased a plot of ground, 195 by 500 ft., at the S. W. corner of Westmoreland and C Sts. for the sum of $29,500. On this site they will have erected a new plant under the direction of W. E. S. Dyer, construction engineer, located in the Land Title Bldg., Philadelphia. Mention of this improvement was made in a previous issue.

Pennsylvania, Philadelphia. Additional space has been leased by the Cambridge Worsted Company and 10 new looms will be installed. Fancy Worsted for men's wear are manufactured on present equipment of 19 looms.

*Rhode Island, Bristol. The brick addition to the Cranston Worsted Mills is nearing completion. It is 65 ft. long by 46 ft. wide, 4 stories high.

*Tennessee, Cleveland. The Cleveland Woolen Mills have under consideration a plan to increase their equipment by the addition of 12 more looms. It has previously been incorrectly reported that additional looms had been installed.

*Vermont, North Montpelier. The contract for the construction of the new mill to replace the old plant of the Little Mfg. Company, recently burned, has been awarded to A. Lane of Barre. The money received from the insurance on the old plant, amounting to $10,000, will be put back into the plant and Harry Daniels of East Montpelier will provide the additional capital necessary to finance the new mill. From 35 to 50 hands will be given employment making white flannels and colored woolen goods for children's garments, the lines which were manufactured successfully in the old mill. Manufacturing will probably be resumed in September. Fred and Walter Little will manage the mill.

*Wisconsin, Chippewa Falls. Preparations are now being made for the erection of the addition to the Chippewa Falls Woolen Mill, reported some time ago. The enlargement will be 3 stories high with basement, 35 by 60 ft. The basement will be used for dyeing and wool scouring. The carding department is to be increased also.

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Mills Starting Up.

*Connecticut, Rockville. Some new machinery is being installed in the Saxony Mill recently purchased by the James J. Regan Mfg. Company from the Hockanum Company. This department will have 40 looms and a finishing department. Yarn will be supplied from the yarn department of the Regan Company. As noted, L. M. Dillon has been engaged as superintendent and designer.

Massachusetts, South Framingham. The new A. W. Emmons Company has begun manufacturing ladies wool hats, plain and bright finish. The factory is located on Wellington Ave. and occupies the brick building which was formerly the power plant of the chair factory. A large addition has been built to the brick building, more than doubling its capacity. Arthur W. Emmons, the president, was formerly connected with Emmons Bros. Co., manufacturers of wool hats with plants in Boston and Haverhill. George L. Hanna is treasurer and buyer; Charles J. Mattan, vice-president, and F. Howard Simmons, secretary and sales-manager. The concern has a salesroom at 604 Broadway, New York City.

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Mills Shutting Down.

Maine, Camden. The Lincoln Woolen Company has shut down for an indefinite time. This company started up the old Mt. Battie Mill a year or two ago manufacturing woolens.

Massachusetts, New Bedford. Holden-Leonard Company have announced that the Oneko Woolen Mills will be closed about the end of May. It is reported some of the machinery will be moved to the company's mill at Bennington, Vt.

New Hampshire, Franklin. What is known as the Aiken Mill section of M. T. Stevens & Sons Company has been shut down. Carding and spinning operations were carried on in this mill and 40 hands were employed. It is hoped that the shut-down will last only a short time.

New Hampshire, Goff's Falls. The Devonshire Mills, manufacturers of men's and women's suitings and coverts, have shut down indefinitely.

KNIT.

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New Mills.

*New York, New York City. The Schwartz Knitting Mills, reported incorporated a short time ago with authorized capital stock of $50,000, have established a plant at 141 West 36th St. and are operating 20 knitting machines and 8 sewing machines on knit cloth and sweater coats for men and women. The plant is equipped with a dye house, electric power equipment, etc. The product is sold direct. Nathan Schwartz is president, superintendent and buyer. S. W. Schwartz is treasurer.

*New York, New York City. A plant is being operated at 96 Grand St. by the Art Knitting Mills, recently reported incorporated under Brooklyn with capital stock of $3,000. Eight new knitting machines have been installed and are manufacturing knitted neckwear. Ben Bangser is president, and J. Rosenbloom is treasurer.

New York, New York City. R. Del Gallego & Company, commission merchants, 59 Pearl St., will establish a new full fashion hosiery mill and will begin manufacturing as soon as machinery can be received and set up. They will operate by electric power and finish the product.

*North Carolina, Chapel Hill. The Blanche Hosiery Mills Company, incorporated in March with outhorized capital stock of $100,000, is manufacturing men's, women's and children's hosiery on 75 knitting machines. Operations were begun in January. The authorized capital stock is $100,000 and $15,000 has been paid in. W. S. Roberson is president; W. E. Lindsey, treasurer, manager and buyer; J. F. Partin, superintendent, and L. C. Vaughn is the selling agent.

*North Carolina, Wendell. R. B. Whitley, who heads the new Wendell Knitting Mills Co., for which a plant is under construction, hopes to begin manufacturing about July 1. The initial equipment will be 50 knitting machines to make seamless hosiery. Particulars of this company have been given previously.

*Ohio, Greenville. The branch plant of the Union Underwear Company of Piqua, which is being established here, will be in operation within two weeks. Ten knitting machines and 50 sewing machines will be the initial equipment. The Union Underwear Company manufactures men's union suits.

*Pennsylvania, Allentown. The new knitting plant at Law and Chestnut Sts. operating under the name of the Astrachan Company, Ltd., has capital stock of $2,500, and manufactures astrachans on equipment of eight heads. The plant is operated by electric power and gives employment to fifteen people. Auffmordt & Company, New York, are the selling agents.

*Pennsylvania, Bethlehem. The new knitting plant being established here will be known as the Central Knitting Company, not the Crescent Knitting Company as reported previously. A 2-story brick building at 12th and Broad Sts., formerly used as a furniture factory, has been taken over and is being remodeled. Manufacturing will be started about June 15 making children's underwaists. Irvin J. Hunsicker and E. S. Buckman, both of Allentown, are president and treasurer, respectively. J. Fink Thompson, also of Allentown, will be manager.

*Pennsylvania, Cambridge Springs. J. A. Bolard, secretary of the new Cambridge Springs Knitting Company, which was recently incorporated under the laws of Pennsylvania with capital stock of $20,000 to establish a knitting mill in Cambridge Springs, expects the plant to be ready to begin operations about June 1. The company is financed and controlled by local capital and the officers are G. L. Wade, president; C. W. Jones, vice-president; J. A. Bolard, secretary and N. H. Bertram, treasurer. George Cooper, who comes from Cleveland, Ohio, and is a practical foreman, has charge of the knitting department. It is the purpose of the company to confine its output exclusively to a high grade of ladies' knit underwear.

*South Carolina, High Point. Some of the machinery equipment for the new Crown Hosiery Mills has been received. The mill buildings, which have been under construction for some time, are not quite finished. The plant when completed will consist of a 2-story mill, 100 by 60 ft., with a 2-story dye house, 40 by 60 ft., equipped with 100 knitting machines, complete dyeing and finishing equipment, etc. The capital stock is $40,000, all paid in. T. A. Kearns is president, and G. H. Kearns is secretary and treasurer.

*Tennessee, Englewood. The Englewood Mfg. Company, a new concern recently organized, is building a 2-story mill, 40 by 65 ft., with boiler and dye room connected. This building will be completed in about thirty days. Fifty knitting machines and steam power equipment have been ordered. The company is incorporated with capital stock of $50,000.

Virginia, Norfolk. A building at Chestnut and King Streets has been leased by the Wallace Wilson Hosiery Company of Frankford, Philadelphia, and a small branch plant will be established. Machinery is expected shortly and the branch will probably be in operation in ten days or two weeks. The Wallace Wilson Hosiery Company advises that the small mill at Norfolk is as yet only an experiment and that they will be unable to say anything in regard to the permanency of the project for several months.

*Washington, Seattle. The Octonek Knitting Company, a new concern recently organized as noted, is established at 425 Union St. and is manufacturing sweaters, employing twelve hands. 2/30s, 2/7s and 4/15s yarns are used. The capital stock of the company is $30,000; George O. Sanborn, president and buyer; J. H. Breese, treasurer; and A. C. Wilhelm, superintendent.

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Enlargements and Improvements.

Canada, Ontario, Amherstburg. The Hamilton & Lewitt Knitting Company, Ltd., are preparing to build a 3-story factory building which will double the present capacity. This company manufactures hosiery, sweaters and underwear and moved to Amherstburg about a year ago from Glencoe, Ontario.

Connecticut, Naugatuck. Preparations being made by the Dunham Hosiery Company for running the sweater coat department with electric power, are nearly completed.

*Illinois, Rockford. The work of installing machinery in the new 11-story mill of the B. Z. B. Knitting Company has been started. It will be equipped to manufacture women's cotton full fashioned hosiery, the hosiery machines being of their own manufacture.

Iowa, Atlantic. It has practically been decided to build an addition to the building in which the Atlantic Knitting Company is located. The matter has not been decided definitely but a decision will be reached shortly. If the enlargement is built it will be of the same dimensions as the present building and will double the size. The business of the Atlantic Knitting Company, which is the manufacture of sweater coats and fancy knit goods, is constantly growing. Carl Lauritzen is treasurer and buyer.

Maine, Houlton. The Houlton Woolen Mill is shut down for a few days while repairs are being made and some new machinery installed. Sweaters, sweater coats, cardigans and caps are manufactured on two sets of wool cards, 23 knitting and 5 sewing machines. J. C. Dill is treasurer, superintendent and buyer.

*Maryland, Frostburg. The Parker Hosiery Mill & Dye Works of Portsmouth, Va., have ordered 26 additional machines for their branch plant in Frostburg. Eighty-six machines are now operated in this plant on misses' ribbed hosiery. They are well satisfied with the prospects in Frostburg. H. A. V. Parker, Portsmouth, Va., is the buyer.

*Massachusetts, Cambridge. The Sterling Knit Goods Company has completed the removal of its plant and business to the new mill at Parkway and Stiles Sts., Cambridge. The new plant gives an increase of about one-third on their lines of full fashioned underwear, children's union suits, and sweaters, in cotton, woolen, merino, and silk. The equipment is now 100 knitting machines and 50 sewing machines with complete bleaching and finishing departments. W. A. O'Brien is president and treasurer; F. C. Cook is vice-president and buyer.

Massachusetts, South Framingham. Brown Durrell Company of Boston have purchased a lot of land on which they will erect a bleaching plant. A knit underwear plant is operated in South Framingham at present by Brown Durrell Company, who are large jobbers of dry goods.

Massachusetts, Springfield. The new mill being built by the Potter Knitting Company is well under way. This will be a 5-story building of mill construction, 180 by 50 ft. Frederick T. Ley & Company are the general contractors and George P. B. Alderman of Holyoke is the architect. It is expected that rapid progress will be made. Space in the new mill is to be leased to the Hampden Knitting Company of which C. B. Potter is treasurer. The new mill will make possible a large increase over the present plants of the Potter Knitting Company and the Hampden Knitting Co.

Massachusetts, Ware. Thirty-six additional motors ranging from 10 to 75 h. p. with other electrical equipment, will be installed by the Otis Company, manufacturers of cotton woven and knitted goods. The contract has been awarded to the General Electric Co.

*Michigan, Grand Rapids. The work of building another story on the old plant of the Globe Knitting Works will be completed in June. The additional floor will be used to increase the finishing department.

*New Jersey, Newark. The plant of the Rivoli Silk Hosiery Company, which was burned last December and since rebuilt, is in full operation and will be increased from time to time. The capital stock was recently increased from $10,000 to $50,000. Ladies' ingrain full fashioned silk hosiery is manufactured on 291 sections of full fashioned machines. L. D. Gutman is president, Dewitt Gutman, treasurer and agent, and A. Poetzel is superintendent. Gutman Brothers, 452 Broadway, N. Y., are the selling agents.

New Jersey, Newark. The Essex Knitting Mills, operated by Cohen & Son at 280-84 Plane St., with 16 knitters and 4 sewing machines on worsted hockeys and toques, have recently placed an order for a number of flat knitters on which they will manufacture a line of sweater coats, Shakers.

New York, Amsterdam. The contract has been awarded by the Blood Knitting Company for a 2-story brick addition to its plant on Washington St. to be used as a picker room. It has been noted that a cotton yarn mill is to be established by this company in the building now occupied by the Chalmers Knitting Company when the latter concern moves to its new building. C. R. Makepeace & Co. are the architects.

New York, New York City. The New York Crown Knitting Works, manufacturers of sweater coats and bathing suits, have moved from 177 Essex St. to 135 Grand St., and added ten new knitting machines and four sewing machines. Harry Kopolsky is the buyer. This plant was formerly operated under the name of the Crown Knitting Mills by A. Kopolsky & Son.

New York, Utica. J. A. Firsching, manufacturer of textile machinery, has let a contract for a new factory, 2 stories and basement, 118 by 54 ft., located on a railroad siding on Broad St. The building is to be of mill construction. Mr. Firsching's business has outgrown its present quarters and he hopes to be able to move into the new plant by October 1.

New York, Warsaw. The Brown Knitting Company is adding new lines of coat sweaters for men, boys and women and has fitted up the building formerly used as a glove factory with machinery for this department. Electric power from the lines of the Warsaw Gas & Electric Plant will be used.

*New York, Watertown. Six new knitting machines will be installed by the Shaughnessy Knitting Company to balance the equipment. It has been noted previously that the output would be increased and a number of machines added.

North Carolina, Salisbury. It is reported that the Meredith Hosiery Mfg. Company, which began operations in the old laundry building on North Long St. last December, is to place additional machinery in its plant. Half hose and misses' ribbed hosiery is manufactured on 20 knitters operated by electric power. The product is sold in the gray. J. C. Ketchie is treasurer and W. L. Horah is manager and buyer.

*Ohio, Piqua. The Piqua Hosiery Company has awarded the contract for ten knitting machines and twenty-two sewing machines. Recently the capital stock was increased from $75,000 to $150,000 and it was noted that increases would be made. Men's fleeced, ribbed union suits in cotton, worsted, silk and merino are manufactured.

*Ohio, Portsmouth. The Mitchell Mfg. Company, which has been making shoe laces, corset laces, and braids of various kinds, has purchased the equipment and stock of the Scott Knitting Company, located in the Shelby Bldg., who have for several years been making a knit union suit going direct to the retail trade with their product which was a high grade article. The plant has been shut down for several months. The new owners will move the machinery into a new brick building entirely separate from their present business and manufacture men's medium grade, closed crotch, knit union suits for the jobbing trade. This department will be entirely separate from their present business, but will be under the same head and management. At the present they expect to start with about 20 knitting machines and 75 sew-

ing machines, and a capacity from 70 to 80 dozen per day. An increase will be made immediately as soon as they get the new plant under way. The Scott Knitting Company made a very satisfactory garment for the retailer, but the plant was too small to make the business as successful as it should have been from a financial standpoint. The new owners hope to make it in a short while one of the largest plants making this grade of goods.

*Pennsylvania, Kutztown. Following the incorporation of the business of H. K. Deisher under the name of the Deisher Knitting Mills, which was recently reported, the capacity will be increased. It will not be necessary to enlarge the building, as the knitting room annex built several years ago has room on the third floor for 50 more hands. They expect to employ about 75 hands when in full operation. The capital stock of the new company is $100.000. H. K. Deisher is president, superintendent and buyer, Philip D. Hoch is treasurer, and L. R. Seidell is secretary. Light and heavy weight underwear for men, women and children is manufactured, using 10s to 80s yarns.

Pennsylvania, Lewistown. Thompson Bros., proprietors of the Lewistown Knitting Company, will enlarge their plant. Mercerized hose and seamless half hose are manufactured on present equipment of 230 latch needle knitting machines and 26 loopers.

Pennsylvania, Reading. The Glasser Hosiery Company, Pearl and Kerper Sts., has practically doubled the equipment of its plant which now contains 112 knitters, 25 ribbers and 14 loopers. This equipment is being operated on seamless hosiery in lisle, cotton, art silk, and pure silk thread. Edw. Glasser is president and buyer.

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*Massachusetts, Cambridge. The Sterling Knit Goods Company has completed the removal of its plant and business to the new mill at Parkway and Stiles Sts., Cambridge. The new plant gives an increase of about one-third on their lines of full fashioned underwear, children's union suits, and sweaters, in cotton, woolen, merino, and silk. The equipment is now 100 knitting machines and 50 sewing machines with complete bleaching and finishing departments. W. A. O'Brien is president and treasurer; F. C. Cook is vice-president and buyer.

Massachusetts, South Framingham. Brown Durrell Company of Boston have purchased a lot of land on which they will erect a bleaching plant. A knit underwear plant is operated in South Framingham at present by Brown Durrell Company, who are large jobbers of dry goods.

Massachusetts, Springfield. The new mill being built by the Potter Knitting Company is well under way. This will be a 5-story building of mill construction, 180 by 50 ft. Frederick T. Ley & Company are the general contractors and George P. B. Alderman of Holyoke is the architect. It is expected that rapid progress will be made. Space in the new mill is to be leased to the Hampden Knitting Company of which C. B. Potter is treasurer. The new mill will make possible a large increase over the present plants of the Potter Knitting Company and the Hampden Knitting Co.

Massachusetts, Ware. Thirty-six additional motors ranging from 10 to 75 h. p. with other electrical equipment, will be installed by the Otis Company, manufacturers of cotton woven and knitted goods. The contract has been awarded to the General Electric Co.

*Michigan, Grand Rapids. The work of building another story on the old plant of the Globe Knitting Works will be completed in June. The additional floor will be used to increase the finishing department.

*New Jersey, Newark. The plant of the Rivoli Silk Hosiery Company, which was burned last December and since rebuilt, is in full operation and will be increased from time to time. The capital stock was recently increased from $10,000 to $50,000. Ladies' ingrain full fashioned silk hosiery is manufactured on 291 sections of full fashioned machines. L. D. Gutman is president, Dewitt Gutman, treasurer and agent, and A. Poetzel is superintendent. Gutman Brothers, 452 Broadway, N. Y., are the selling agents.

New Jersey, Newark. The Essex Knitting Mills, operated by Cohen & Son at 280-84 Plane St., with 16 knitters and 4 sewing machines on worsted hockeys and toques, have recently placed an order for a number of flat knitters on which they will manufacture a line of sweater coats, Shakers.

New York, Amsterdam. The contract has been awarded by the Blood Knitting Company for a 2-story brick addition to its plant on Washington St. to be used as a picker room. It has been noted that a cotton yarn mill is to be established by this company in the building now occupied by the Chalmers Knitting Company when the latter concern moves to its new building. C. R. Makepeace & Co. are the architects.

New York, New York City. The New York Crown Knitting Works, manufacturers of sweater coats and bathing suits, have moved from 177 Essex St. to 135 Grand St., and added ten new knitting machines and four sewing machines. Harry Kopolsky is the buyer. This plant was formerly operated under the name of the Crown Knitting Mills by A. Kopolsky & Son.

New York, Utica. J. A. Firsching, manufacturer of textile machinery, has let a contract for a new factory, 2 stories and basement, 118 by 54 ft., located on a railroad siding on Broad St. The building is to be of mill construction. Mr. Firsching's business has outgrown its present quarters and he hopes to be able to move into the new plant by October 1.

New York, Warsaw. The Brown Knitting Company is adding new lines of coat sweaters for men, boys and women and has fitted up the building formerly used as a glove factory with machinery for this department. Electric power from the lines of the Warsaw Gas & Electric Plant will be used.

*New York, Watertown. Six new knitting machines will be installed by the Shaughnessy Knitting Company to balance the equipment. It has been noted previously that the output would be increased and a number of machines added.

North Carolina, Salisbury. It is reported that the Meredith Hosiery Mfg. Company, which began operations in the old laundry building on North Long St. last December, is to place additional machinery in its plant. Half hose and misses' ribbed hosiery is manufactured on 20 knitters operated by electric power. The product is sold in the gray. J. C. Ketchie is treasurer and W. L. Horah is manager and buyer.

*Ohio, Piqua. The Piqua Hosiery Company has awarded the contract for ten knitting machines and twenty-two sewing machines. Recently the capital stock was increased from $75,000 to $150,000 and it was noted that increases would be made. Men's fleeced, ribbed union suits in cotton, worsted, silk and merino are manufactured.

*Ohio, Portsmouth. The Mitchell Mfg. Company, which has been making shoe laces, corset laces, and braids of various kinds, has purchased the equipment and stock of the Scott Knitting Company, located in the Shelby Bldg., who have for several years been making a knit union suit going direct to the retail trade with their product which was a high grade article. The plant has been shut down for several months. The new owners will move the machinery into a new brick building entirely separate from their present business and manufacture men's medium grade, closed crotch, knit union suits for the jobbing trade. This department will be entirely separate from their present business, but will be under the same head and management. At the present they expect to start with about 20 knitting machines and 75 sew-

ing machines, and a capacity from 70 to 80 dozen per day. An increase will be made immediately as soon as they get the new plant under way. The Scott Knitting Company made a very satisfactory garment for the retailer, but the plant was too small to make the business as successful as it should have been from a financial standpoint. The new owners hope to make it in a short while one of the largest plants making this grade of goods.

*Pennsylvania, Kutztown. Following the incorporation of the business of H. K. Deisher under the name of the Deisher Knitting Mills, which was recently reported, the capacity will be increased. It will not be necessary to enlarge the building, as the knitting room annex built several years ago has room on the third floor for 50 more hands. They expect to employ about 75 hands when in full operation. The capital stock of the new company is $100,000. H. K. Deisher is president, superintendent and buyer, Philip D. Hoch is treasurer, and L. R. Seidell is secretary. Light and heavy weight underwear for men, women and children is manufactured, using 10s to 80s yarns.

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New Publications

(Any work noticed under this head can be obtained through the office of this journal.)

Fine Cotton Spinning, by J. W. Lomax, lecturer of cotton spinning at the Oldham Technical School; 122 pages, 4 1/2 by 7; Emmott & Co., 65 Kings St., Manchester, England. Price $1.25.

The contents of this book consist mainly of a series of articles originally published in the "Textile Manuafcturer" of England. The author has aimed to make them thoroughly practicable and thus adapted to the requirements of workmen and mill officials, as well as students. A chapter dealing with the purchasing of cotton and the means adopted by the spinner to cover yarn sales in cotton futures is included in the book, the contents of which is as follows: Terms on which Cotton is Bought; Testing Raw Cottons; Egyptian Cottons; Opening and Scutching Machinery; Carding Engines; Combing; Drawing; The Production of Good Roving; The Flyer Throstle, Ring Frame and Mule; Modern Mill Planning; The Systematic Cleaning and Overhauling of Machinery.

The Materials Used in Sizing, by W. F. A. Ermen, M. A.; 126 pages, 4 1/2 by 7 1/4; D. Van Nostrand Co., 25 Park Place, New York. Price $2.

The author of this book delivered a course of lectures in 1911 before the Manchester School of Technology on the materials used in sizing. These lectures have been carefully revised and are now published in book form together with useful reference tables. The subject is treated under the following heads: The Starches and other Agglutinants, Weighting Materials, Softening Ingredients, Antiseptics, Analysis of Sized Warps and Cloth, Preparation of Normal Volumetric Solutions, tables.

Converting Raw Wool into Worsted Yarn (Transformation des Laines Brutes en Fils Peignes), by Leon Faux; 409 pages 9 1/2 by 12 1/2; Ch. Branger, 15 Rue des Saints-Peres, Paris, France. Price $9.

This elaborate work deals with the French system of spinning. It is written by a practical worsted manufacturer and before its publication won for its author a prize from the Societe Industrielle du Nord de la France. It is a work of exceptional merit. The author has written on the subject only as a practical man can, going into the details of French spinning and arranging the text in systematic and very convenient form. There are a large number of excellent illustrations which add much to the value of the volume. The following abstract of the table of contents shows the scope of the work and the general arrangements: 1, Raw Wool; 2, Grades of Wool, Grading, Baling, Shipping and Buying Wool; 3, The Worsted Thread, Determining the Count; 4, Testing and Conditioning Yarn; 5, Subdivisions of the Worsted Spinning Process; 6, General Principles of Combing, Methods and Machinery; 7, Sorting the Wool; 8, Dusting the Wool; 9, Degreasing; 10, Scouring; 11, Drying; 12, Oiling for the Carding Process; 13, Removing Burs; 14, Carding Machines, Clothing the Cards; 15, Theory of Carding; 16, Automatic Feeds for Cards; 17, Gilling; 18, Backwashing; 19, Principles of Combing; 20, Rectilinear Combs; 21, Curvilinear Combs· 22, Circular Combs; 23, Draft in Combing; 24, Doubling Worsted Tops; 25, The Principles of Gilling; 26, By-Products, Percentage of Noil and Yield from a Lot of Wool; 27, The Grading of Tops and Noils; 28, Calculation for Worsted Combing Machinery; 29, The Fundamental Principles of Preparing Worsted for Spinning; 30, Curvilinear Drawing Mechanism; 31, Rectilinear Drawing Mechanism; 32, Special Types of Gills and Their Use; 33, Mechanism Accessory to Worsted Drawing Frames; 34, Machines Required for Processes Preparatory to Spinning; General Information; 35, Mixing Worsted Products; 36, Principles of Spinning and Machines Required; 37, The Worsted Mule; 38, Ring Spinning Frames; 39, Machinery Required for a Spinning Plant; 40, Testing the Theory of Draft. The text of this very valuable work is in French, but in view of its value as a hand book of French spinning, we believe few American spinners of French yarn can afford to be without a copy.

Notes on Sampling and Testing; a Handbook of the Manchester (Eng.) Chamber of Commerce, Testing House and Laboratory. Price 50 cents.

The second edition of this handbook has recently appeared and contains much new material regarding the sampling and testing of textile materials. Although issued primarily to call attention to the work of the Manchester Testing House, the volume will prove of great value as a reference work to all engaged in the handling of textile materials, particularly at this time when so strong an interest has been aroused in the conditioning textile materials.

Cotton Mill Machinery Calculations, by B. M. Parker; 167 pages, 6 by 9; published by the author. Price $1.

The author of this work, who is well known to our readers, has aimed to give cotton mill workers clear and concise explanations of the various calculations that are needed in operating a cotton mill. The contents of this volume originally appeared in "Cotton" during the past two years. These articles have been revised and new matter added. Following is an abstract of the table of contents: Discussion of Motion, Calculating Draft from Gearing; Calculation for Pickers; Card Calculations; Combing Process; Railway Heads and Drawing Frames; Hanks and Numbers; Fly Frames; Spinning; Twisting; Organization.

BUSINESS LITERATURE

"All Famous"; The Heine Safety Boiler Co., of St. Louis, Mo.

This pamphlet derives its title from the fact that Heine boilers are in use by companies having trade marks which are very well known as, for instance, Victor Talking Machine, Gold Medal Flour, Budweiser Beer, 57 Varieties of Food Products, N. Y. Central Lines, etc. These trade marks are attractively arranged on the cover of the pamphlet, surrounding the trade mark of the Heine Safety Boiler Co., "Helios," the inference being that the merit of the various trade marks reflects upon the Heine trade mark. Within the pamphlet, there are reprinted a number of advertisements, each one referring to one of the well known trade marks, and stating the character and size of the boiler equipment in use by the company. The pamphlet also contains several advertisements on Heine superheaters, pointing out important advantages of this type of superheater. Copies of this pamphlet may be obtained upon application to the Heine Safety Boiler Co.

Buffalo Mill Exhausters; The Buffalo Forge Co., Buffalo, N. Y.

A 64-page booklet giving an illustrated description of the Buffalo exhaust fans for the removal of shavings, sawdust and emery dust; elevation of cotton, wool and grains; and removal of smoke and fumes. The booklet also contains much practical engineering data and extracts of state laws.

Textile Hints; The J. B. Ford Co., Wyandotte, Mich.

This 45-page booklet contains practical hints on the bleaching, scouring and stripping of wool, cotton and silk goods with Wyandotte textile soda. Part 1 gives directions for the bleaching of woolen goods, yarns, and blankets; fulling fancy cassimers and wool underwear, scouring wool yarn; washing cassimeres, wool underwear, woolen and worsted hosiery. Part 2 is devoted to silk and gives directions for boiling out silk, silk dyeing, boiling out silk hosiery, and removing oil from tussah silk. Part 3 is devoted to the bleaching of cotton hosiery, underwear, jute yarn, and towels. These formulas are selected only after they have been demonstrated to be thoroughly reliable and practical under all the conditions commonly found in a mill. This book is sent free upon application to any mill man who will write for it.

"Dixon Graphite Brushes"; The Joseph Dixon Crucible Co., Jersey City, N. J.

Dixon's brushes for dynamos and motors have long had an enviable reputation for perfect commutation. These brushes being composed almost entirely of high grade graphite prevent sparking and wear of the commutator. They do not gum the commutator, are tough and strong and have very long life if properly adjusted. Another product mentioned is Dixon's graphite resistance rods which are furnished in a large number of combinations of size and electrical resistance. The fact that the rods are cheap and are so compact makes them especially desirable.

The Unit Method of Construction for Reinforced Concrete Buildings; The Unit Construction Co., St. Louis, Mo.

This catalogue gives a description of the unit construction of reinforced concrete buildings which is a patented method of assembling materials and erecting buildings. It differs from the ordinary method of reinforced concrete construction in that all concrete is cast in forms on the ground in the shape of individual units which are seasoned and then assembled in the building as provided for in the plan. There is no difference in the materials used, the difference being only in the application of the unit construction methods. The catalogue contains numerous illustrations of concrete buildings constructed by the Unit method. Among them are views of the buildings of the Postex Cotton Mills, Post, Tex.

Air Washers; The Spray Engineering Co., 201 Devonshire St., Boston, Mass.

This booklet contains an illustrated description of the apparatus built by the Spray Engineering Co. for moistening air. The water is sprayed in the same direction as the air. This, it is claimed, results in a saving in driving power. The apparatus is used for cooling water, oil burners, spraying asphalt, irrigating orchards, fertilizing soil, humidifying air, settling dust, condensing fumes and for park sprinkling.

Is There Rosin in Cling-Surface?; The Cling-Surface Co., Buffalo, N. Y.

A new 12-page booklet just issued to prove that there is no rosin in "Cling-Surface" belt preparation. The manufacturers show several fac-simile reports of chemical analyses made in England and Germany. Prof. Orndorf of Cornell University is quoted. The booklet also lists many prominent users.

Industrial Notes

A NEW DYEING MACHINE COMPANY

John H. Giles, until recently connected with the Klauder-Weldon Dyeing Machine Co., of Amsterdam, N. Y., as manager, has organized the John H. Giles Dyeing Machine Co., whose headquarters will be at Amsterdam. The officers are: President, John H. Giles; vice-president, Donald M. Giles; directors, John H. Giles, D. M. Giles, E. C. Giles, Charles Frohlich and B. S. Keefer.

The new concern is planning to build a line of dyeing machinery, including a new rotary skein dyeing machine, as well as raw stock, garment, hat, hosiery, worsted top, cotton beam and other modern types of dyeing apparatus. Announcements of the new machinery will be made from time to time, as they are placed upon the market. Mr. Giles, during his five years as manager of the Klauder-Weldon Co., has become widely known in the trade and his many friends will be interested to learn of his new undertaking.

CHANGE OF NEW YORK OFFICE

The Lord & Nagle Co., publishers of the Textile World Record, has moved its New York office across the street from 123 Liberty St. to 120 Liberty St., where it has larger quarters on the sixth floor. The telephone number remains the same. A. H. Tyler, the New York manager, is always glad to see customers and is able to welcome them in more attractive quarters than ever before.

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RECENT INSTALLATIONS

Among the recent installations of the "Hoff-Man" "FFF" Underwear Presses, is one by the Crossingham Knitting Mills, Philadelphia, manufacturers of Dr. Spencer's Sanitary Underwear.

The Last Long Underwear Co., of Oswego, N. Y., which manufactures a very high grade of light weight summer underwear, has also recently installed a "Hoff-Man" "FFF" Underwear Press.

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"SERVICE—WITH A SMILE"

"An amendment to our service slogan makes it read 'Service—with a smile,'" says President George A. Kissel of the Kissel Motor Car Company. "I hold that service may be as thorough as it can be made and yet completely lose its effectiveness if grudgingly or unpleasantly administered. We have endeavored to instill into the minds of our salesmen and agents that cheerful treatment of owners is as invaluable an asset to our business as is the car itself. Our service contract with buyers of KisselKars is as plain as it is liberal, and whatever they are entitled to should at all times be accorded with a display of as much good will as good skill."

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AN IMMENSE WOVEN BELT

It is not often one comes across such a remarkable piece of work as that just completed in the Rossendale district. The largest woven belt ever manufactured in any country has been dispatched from Waterfoot (Rossendale) this week. The length of the belt when in the loom was 760 feet, and it was 39 1/4 inches wide. The thickness was half an inch, and when coiled the completed belt stood seven feet high. Its total weight was just under 2 1/2 tons, and 25 cwts. of creosoting was required in which to soak the belt after it had been woven. The loom on which it was woven is a particularly massive one and weighs about twelve tons. Messrs. John Taylor & Company, Limited, of Waterfoot, the manufacturers, are sending the belt out to Scandanavia, where it is to be used in the lumbering areas for conveying wood. Not only is the production of the belt a noteworthy feat, but the construction of a machine capable of efficiently performing the work is no less noteworthy. The makers of the loom are Messrs. Robert Hall & Sons (Bury), Ltd., Bury, who must by this time be extremely familiar with work of an equal or greater magnitude, produced on machines manufactured by them.—Textile Recorder.

DRIVING LINE SHAFTING

BY GEORGE N. VAN DER HOEF, M. E.,
of the Dodge Mfg. Co.

The ideal arrangement of a motor driven line shaft is with the motor situated at the middle of the line. This permits the use of shafting of the smallest possible diameter, as only one-half the power is transmitted through same, and minimizes friction losses.

If a friction clutch coupling is placed at each side of the motor, either half of the line can be run by itself.

If this service condition does not occur too frequently, the same net yearly efficiency may be secured as by dividing the group served by the whole line into two groups, each with its own motor, and with a considerable saving at first cost as well as in electrical attendance.

Where direct coupling is not feasible, the question as to what form of reduction transmission is best and whether the reduction should be made in one or more stages will depend on local conditions, and the difference in the speeds of the motor and line shaft.

With small motors and a large speed reduction, cut gears are commonly used for at least the first reduction. This method is seldom used, however, in driving line-shafts.

In the case of medium sized motors, some form of silent chain or leather or rubber belts are generally used. If one of these forms of silent chain are used the reduction is generally made in one stage. If belting is adopted, one or two stages.

The mill owner should bear in mind that a two stage reduction sometimes shows a higher efficiency than a one stage where the pulleys are greatly different in diameter.

In the case of large motors, rope transmission will be found the most satisfactory and efficient means for reducing the speed. The freedom from slip gives as uniform rotation to the line-shaft as could be secured by direct coupling.

This whole question should be carefully considered in every case.

The direct drive is of course the most efficient, but the low speed motor is expensive. In the case of the larger sizes the question of support is one that must be carefully considered as large low speed motors are very heavy.

This question of weight sometimes makes it necessary to place the motor at one end of the line near a wall or even to choose a high speed motor and use the necessary transmission to reduce the speed to the point desired.

Counter-shafting should be eliminated entirely, or at least as far as possible.

The ideal construction is high speed shafting small pulleys, either of the tight and loose type or with attached friction clutches, and direct drive from the line shaft to the individual machine. This plan is now in use in many of the most up-to-date mills.

In mills where the load per line-shaft is light, maximum efficiency is sometimes secured by what may be called the compound group system. In this, a single motor is used to drive several lines, usually an entire floor. The motor is direct coupled or belted to one shaft and the other

shafts are driven from this shaft by either belts or ropes.

By using the Dodge American system of drop-off rope transmission, each shaft can be driven direct from the motor with one rope and without any intermediate losses, such as must occur where the shafts are driven, one from the other, all across the room.

In the smaller mills where the individual floor loads are small, two or more floors can be driven from the same motor by using this same form of rope drive which works just as well vertically as it does horizontally.

Rope gives a better and more efficient drive from a motor than a belt, and it should be employed whenever possible. It is not possible, however, to use as small wheels with rope as with belting, so the choice as to which to use is frequently limited by the speed of the motor and the amount of speed reduction required.

With large motors, particularly those known as low speed, either form of transmission can be generally used.

When rope can be used and the drive is a plain straight drive from the motor to the shaft, either the American or continuous system, or the English or separate wrap system, will work all right; but it will generally be found that the continuous system will be rather more satisfactory in the long run.

In selecting motors it is well to see whether or not the over-load and starting torque characteristics of the motor can be fully utilized in actual service. Many motors have a very high starting torque when thrown directly on the line. This is a very valuable feature from the mill owner's point of view, but commonly the service company will not permit this on account of line disturbance, and insist on the use of compensating coils in starting that completely nullify this advantage.

It is usually better for the mill owner to purchase his motors direct, but he should not do so until after full consultation with the company from whom he expects to buy current.

The question as to whether or not to use electric power is almost always a difficult one for the mill owner or his consulting engineer to decide.

Applied engineering is not an exact science, and good horse sense is more conducive to dividends than too much efficiency figuring.

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THE CLIPPER BELT LACER CO.

Some time ago we called attention to the profit sharing plan of the Clipper Belt Lacer Co., Grand Rapids, Mich. This plan has resulted in a large increase in the output of the establishment and in the wages of the employes, with a material reduction in the cost of production. The system has brought about a spirit of cooperation between the employers and the employes, which accounts for the satisfactory results. Charles P. Foote, the president of the company, has recently been engaged in a campaign for the raising of $250,000 for the new Y. M. C. A. Building in Grand Rapids. The Clipper Belt Lacer Co. took a prominent part, with a liberal subscription to the fund. Every officer in the company and every one of the 48 employes also subscribed to the fund.

SPRAY HEADS

E. W. S. Jasper, 120 Liberty St., New York City, president of the Continental Latch Needle Co., has recently taken the agency for Lechler's Torpedo Sprayer for the atomization of water and other thin fluids.

Abroad these sprayers are used in the textile trade for the conditioning of yarns in yarn cellars. The yarn stored in boxes is dampened either by humidifying the air or by slightly sprinkling the cops direct with a sprayer.

It is used for the moistening of cotton goods and other fabrics, also for the absorption of dust. In central humidifying and ventilating plants the sprayers are placed in a separate room, or air-shaft, from which the moistened air is driven by ventilators into the work rooms.

The sprayers come in various sizes adapted to different pressure per square inch. No other apparatus is required, as the spray heads are simply attached to water pipes under ordinary pressure.

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NORTH CAROLINA TEXTILE SCHOOL

We have received a collection of very attractive samples of fancy cotton goods which were designed by the students in the textile department of the A. and M. College, West Raleigh, N. C. They reflect great credit on the instruction given at this school where students get a full textile course, including designing and weaving.

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MOVE INTO WOOLWORTH BUILDING

The New York office of the Murphy Iron Works, manufacturers of the Murphy automatic smokeless furnace, has been removed from the Hudson Terminal Building to the Woolworth Building, Room 901. H. W. Canning is in charge.

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FOSTER SUPERHEATERS

Owing to the rapid increase in the demand for Foster superheaters the Power Specialty Co. is building a new erecting shop 300 ft. by 96 ft. Among recent contracts received for Foster superheaters are the following: The Public Service Corporation, Burlington, N. J., 3600 h. p. for installation in Edge Moor boilers; The Rhode Island Co., Providence, R. I., 5000 h. p. for installation in Bigelow-Hornsby boilers; Narragansett Electric Light Co., Providence, R. I., 6000 h. p. for installation in Babcock & Wilcox boilers; Havana Electric Railway, Light & Power Co., Havana, Cuba, 14,500 h. p. for installation in Babcock & Wilcox boilers; J. I. Case Threshing Machine Co., Racine, Wis., 2000 h. p. for installation in Wickes boilers; Rochester Railway & Light Co., Rochester, N. Y., 5250 h. p. for installation in Bigelow-Hornsby boilers, 2400 h. p. for installation in Babcock & Wilcox boilers; Moline-Rock Island Mfg. Co., Moline, Ill., 9000 h. p. for installation in Stirling boilers; Cleveland Electric Illuminating Co., Cleveland, O., 20,148 h. p. for installation in Stirling boilers; Jones & Laughlin Steel Co., Pittsburgh, Pa., 3528 h. p. for installation in Rust boilers; The Brier Hill Steel Co., Youngstown, O., 6000 h. p. for installation in Erie City boilers.

A WINDOW CLEANSER

System experts have carefully watched the results of negligence in this particular, and have found that in dirty, dark factories, absentees are much more common among employes than in factories that are kept clean and wholesome.

The Society for the Prevention of Tuberculosis in New York City say that dirt and impure air are the allies of consumption. Fresh air in plenty to prevent consumption—sunshine kills the germs. Keep your windows clean. It is not sufficient merely to wash them in the nearest canal. They should be thoroughly cleansed.

There is a cleansing compound called Glasbrite which is a thorough cleanser for mill windows. It cleans and polishes at the same time. Glasbrite is primarily a dry cleaner, but may be used also with the scrubbing brush. A liberal free sample will be mailed free to any mill owner, or anyone who is connected with the mill, who desires to try this material on their windows, if they will write and mention this paper. Address your request to The Benjamin P. Forbes Company, Room 5, Beckman Bldg., Cleveland, O., and they will send a large free sample, by parcel post, prepaid, without obligation on the part of the recipient.

BUILDING NEW FACTORY

A new factory will be built by J. A. Firsching on Broad St., Utica, N. Y., located on a railroad siding for convenient shipment of goods. Contract has been let for a building of mill construction, two stories and basement, 118 by 54 ft. Mr. Firsching's business has increased so rapidly the past year that he has outgrown his present quarters and needs much more room to enable him to make more prompt deliveries to his customers and to manufacture under more advantageous conditions. His line of labor saving machinery for knit goods manufacturers is now very comprehensive and during the past year he has developed some new improvements, which have been very successful and have brought many orders. He hopes to be in the new plant by October 1st, and in the meantime, is doing his utmost to satisfy the requirements of his customers and make deliveries as quickly as possible.

THE KNIT GOODS MANUFACTURERS' ASSOCIATION

The 8th annual meeting of this association was held on May 14 at the Hotel Utica, Utica, N. Y. About fifty knit goods manufacturers were present in addition to a number of guests. At the business meeting which followed the luncheon the report of the committee on the tariff was read by the chairman, John K. Stewart and approved. A committee appointed to visit Washington for the purpose of securing adequately protective rates on knit goods. This delegation consists of the following manufacturers: John K. Stewart, Nathan Hatch, Andrew Frey, Quentin McAdam, J. R. Blood, George Clarke, Charles C. Washburn, W. T. Briggs, Thomas R. Bailey, John E. McLoughlin, W. D. MaHony, L. U. Lynt, W. H. Tuttle and Peter McCarthy. A resolution was adopted in favor of a permanent tariff commission.

The election of officers resulted as follows: President, John E. McLoughlin; vice-presidents, John K. Stewart, George Clarke, L. U. Lynt, J. H. Reaney, T. R. Bailey; treasurer, Beecher M. Crouse; secretary, W. H. Morton; executive committee, G. M. Traber, W. D. Mahony and H. S. McElwain.

THE "FATHER" OF STEEL PULLEYS

It is only a comparatively short while ago that there was such a thing as a pulley made of steel. Men used belt pulleys for more than a century without once employing, in their manufacture, steel.

It remained for Thomas Corscaden to make pulleys exclusively of steel. About 1895 he exhibited a model of what was shortly to become famous as the "American" steel split pulley. His invention, in common with many other great discoveries, was for a time only cautiously received, it being several years later before a company was formed in Philadelphia for the manufacture of steel split pulleys. Pulley users throughout the country, however, were not so hard to convince as to the merits of this first steel pulley.

The "American" pulley was built on lines of correct construction, of sound mechanical principles, scientifically and yet simply applied. Corscaden's design appealed alike to the practical mechanic and the trained engineer. Pulley users soon saw that "American" steel split pulleys possessed the essentials of pulley efficiency. Through their use, belt slippage was greatly reduced. The smooth surface of the face, provided with a grooved air escape, produced a superior belt grip. The lightness of these pulleys saved power; their tight grip on the shaft obviated the cutting of keyways or the use of set screws. The "American," which was a split pulley, was so easy to apply that it was welcomed by all who tried it. There was no need to spend hours in shaft stripping while possibly the whole plant was lying idle.

Pulley users knew a good pulley when they saw it. The "American" steel split pulley, in thousands of plants, replaced old fashioned makes. The result is that more than two million "American" steel split pulleys are in use, a figure which speaks for itself.

GRADUATION EXERCISES

THE BRADFORD-DURFEE TEXTILE SCHOOL, FALL RIVER, MASS.

The graduation exercises of the day class of the Bradford-Durfee Textile School were held on May 28. The exercises opened with music which was followed with an address by President Leontine Lincoln. Charles H. Fish, of Boston, spoke on the responsibilities of the textile student. The class prophecy was read by Joseph F. Mullen. The medal of the National Association of Cotton Manufacturers was presented to Charles C. Muir by William Evans. Following are the graduates with the titles of the various thesis: Edward H. Beighe, on "Fly Frames or Speeders"; Warren F. Caswell, on "Mill Construction"; John Hilton, on "Speeders"; Nathaniel P. Kendall, on "Carding and Spinning"; Charles C. Muir, on "The Structure of Fabrics"; Joseph F. Mullen, on "A Few Notes on Weaving"; Myron W. Baxter, Jr., on "Weaving and Designing"; Nellie Grant, on "Designing"; Frederick H. Raymond, on "Double Cloth and Ply Fabrics". The exercises closed with remarks by Principal Fenwick Umpleby.

PHILADELPHIA TEXTILE SCHOOL

The Alumni Association of the Philadelphia Textile School held its 12th annual meeting on June 5. After the business meeting of the corporation the following papers were read: "The Composition and Analysis of Waterproofed Fabrics," by Joseph F. X. Harold; "Plushes," by A. A. Levy; "Some Advantages and Limitations of Vat Dyes," by E. C. Bertolet; and "Styling Men's Wear Fabrics," by Laurence B. Stein. The annual commencement exercises of the school were held at Horticultural Hall in the evening. An address was made by Hon. John J. Macfarlane on "Industrial Education and Commercial Prosperity". On June 6 the Alumni Association enjoyed their 10th annual cruise down the Delaware in the S.S. "Samuel H. Ashbridge," which had been chartered for the day. This annual cruise is an event of more than usual interest, giving not only an enjoyable outing, but also an opportunity for members of the Alumni Association to renew old acquaintances. The party returned in time for another important event on the program, the 12th annual banquet, which was held at the Hotel Majestic. Addresses were made by Herman A. Metz, Edwin Farnum Greene, president of the National Association of Cotton Manufacturers, and the Hon. Joseph W. Fordney of Michigan.

THE LOWELL TEXTILE SCHOOL

The graduation exercises of this school were held on the afternoon of June 6. Addresses were made by President A. G. Cumnock and Frederick W. Hamilton, D. D., of the State Board of Education. Franklin W. Hobbs presented the Arlington Mills textile design prize and Principal Charles H. Eames announced the prizes for proficiency in chemistry and also presented diplomas and conferred degrees on the graduates.

This is the first year that the school has awarded degrees from the departments of chemistry and dyeing, and textile engineering. This right was given to the school by the Legislature of last year and degrees were awarded on the completion of a four year course in the above mentioned departments.

The Alumni Association of the School held its annual meeting in the evening in Southwick Hall where a banquet was served. The speakers were Leroy D. Peavey, vice-president of the Babson Statistical Organization of Wellesley Hills, Mass., Theodore N. Kelsey, chief engineer of the Lawrence Mfg. Co., Lowell, President A. G. Cumnock, James T. Smith, clerk of the School, and Principal Charles H. Eames. The toastmaster was Everett B. Rich of the class of 1911.

PRINTED LABELS FOR TEXTILE MILLS

The Acme Print Co., 320 N. 9th St., Reading, Pa., make a specialty of printing for the textile trades and have gained a high reputation for the hosiery bands, labels, tickets, stickers and boards box tops, which they are getting out for the knitting mills throughout the country. Their plant as well as their business has been continuously expanding and the company is now in a position to turn out this class of work in any quantities and on short notice. They solicit orders not only from the knitting trade, but from other branches of the industry as well.

THE ALLIS-CHALMERS MANUFACTURING CO.

On April 16, 1913, the Allis-Chalmers Manufacturing Company took over the properties and entire operation of the business of Allis-Chalmers Company, which latter company during the past year has been in the hands of a receiver. This change marks the end of the Allis-Chalmers receivership and the commencement of the administration of the new company.

Beginning with April 16th all business has been and will be conducted by Allis-Chalmers Manufacturing Company, which starts out under conditions promising success. The new company will operate all departments of the business as conducted by its predecessor and will carry out all contracts on hand for the sale of its products. It has no bonded indebtedness nor liabilities of any character. In addition to all assets of the former Allis-Chalmers Company the new company has over four million dollars additional cash for new working capital which has been raised through the recent reorganization.

The new company will continue to operate the large West Allis works and Reliance works at Milwaukee, the Chicago works, and in addition will control the operations of The Bullock Electric Manufacturing Company at Cincinnati. Otto H. Falk, of Milwaukee, who for the past year has been receiver of the Allis-Chalmers Company and under whose management as receiver the operations of the business have shown marked improvement, has been elected president of the new company. The general offices will be at Milwaukee.

All properties of the new company are in good condition and its inventories and working capital on a sound basis. Its engineering departments are well equipped and the various lines of product now turned out are of the highest quality. Under these conditions it is believed that with the present careful and intelligent management the operations will show substantial profits.

Recent Textile Patents

BLEACHING. 1,061,392. Walther Mathesius, Charlottenburg, Germany.

BOBBIN. 1,061,239. George Hambleton, Goffstown, N. H.

CLOTH CUTTING Machine. 1,062,529. Philip Saltman, Philadelphia, Pa.

CLOTH CUTTING Machine. 1,061,782. George Scott, Amsterdam, N. Y.

CLOTH GUIDING Machine. 1,062,423. Bernard T. Steber, Utica, N. Y.

CLOTH LAYING Machine. 1,061,914. Moses Isaacs, New York.

CLOTH or Fabric Cutter. 1,061,982. Morris Z. Clavans, Philadelphia, Pa.

DRYING MACHINE, Hosiery. 1,062,510. Walter M. Schwartz, Philadelphia, Pa.

DYEING. 1,060,002. Myrtil Kahn and Anton Ossenbeck, Elberfeld, Germany.

DYEING MACHINE. 1,057,265. Jesse M. Payne, Girard, Ala.

DYEING MACHINE, Circulating Rotary. 1,060,954. James H. Skitt, Philadelphia, Pa.

DYEING MACHINES, Revolving Collapsible Beam for. 1,062,493. Frank M. Morton, Phoenix, Ala.

DYEING WOOL and the Like, Apparatus for. 1,060,277. Andrew Murray, Victoria, Australia.

ELASTIC MATERIALS, Manufacture of. 1,061,111. Zacharias Olsson, Hampton Hill, England.

FABRIC. 1,060,368. Alfred Schoenfeldt, Brooklyn, N. Y.

FABRICS with Liquids, Apparatus for Treating. 1,062,245. Walther Mathesius, Charlottenburg, Germany.

FIBER, Separating Animal and Vegetable. 1,061,965. Vincenzina del Prato, Naples, Italy.

KNIT FABRICS, Machine for Uniting. 1,057,106.

KNITTED NECKTIE. 1,060,190. Josef Kellner, Brooklyn, N. Y.

KNITTED WEB and Making Same, Ribbed. 1,062,367. Robert W. Scott, Leeds Point, N. J.

KNITTING MACHINE. 1,062,557. Bernard T. Steber, Utica, N. Y.

KNITTING MACHINES. 1,057,166. Charles H. Perkins, Laconia, N. H.

KNITTING MACHINE Needle. 1,062,366. Robert W. Scott, Leeds Point, N. J.

KNITTING MACHINE Web Receiver and Take-up Mechanism. 1,061,024. Harry Swinglehurst, Boston, Mass.

LOOM. 1,061,836. Emil Graf, Elberfeld, Germany.

LOOM PICKING Mechanism. 1,060,910. Moses M. Lahue, Lowell, Mass.

RECENT TEXTILE TRADE MARKS REGISTERED

67,264. Knitting yarn. Mark: Pine tree. Owner: Max Hauschild, Hohenfichte, Germany.

68,644. Hosiery and knitted underwear. Mark: Fashionette. Owner: E. M. Townsend & Co., New York.

68,755. Hosiery and knitted underwear. Mark: Lady Grace. Owner: E. M. Townsend & Co., New York.

69,219. Cotton goods. Mark: Dynels. Owner: Dykeman, Neill & Loeb, Philadelphia, Pa.

69,288. Cotton goods. Mark: Hydenseek. Owner: A. H. Hyde & Sons, New York.

69,377. Cotton and worsted piece goods. Mark: Falco. Owner: Farr Alpaca Co., Holyoke, Mass.

69,433. Handkerchiefs. Mark: Crystal. Owner: J. Robinson & Co., New York.

67,373. Woolen piece goods. Mark: French Rivers. Owner: French River Textile Co., Mechanicsville, Conn.

68,228. Cotton, wool, linen, silk, etc., piece goods. Mark: M.F.A. Owner: Maurice Frings & Cie, Paris, France.

68,230. Cotton, wool, linen, silk, etc., piece goods. Mark: L.V. Owner: Maurice Frings & Cie, Paris, France.

69,277. Hosiery. Mark: Steadfas. Owner: Arbuthnot-Stephenson Co., Pittsburgh, Pa.

69,639. Yarns. Mark: Necronsett. Owner: Necronsett Mills, Inc., Cumberland, N. C.

69,645. Bunting. Mark: Signal. Owner: U. S. Bunting Co., Lowell, Mass.

69,646. Bunting. Mark: Anchor. Owner: U. S. Bunting Co., Lowell, Mass.

68,520. Textile rope and twine. Mark: Premax. Owner: Plymouth Cordage Co., Plymouth, Mass.

65,636. Underwear. Mark: Blotter-Bal. Owner: Blum Bros., Chicago, Ill.

67,905. Woolen piece goods. Mark: Rickshaw. Owner: Ricketts & Shaw, Monson, Mass.

68,092. Cotton piece goods. Mark: Hunky-Dory. Owner: A. G. Hyde & Sons, New York.

68,645. Silk goods in the piece. Mark: Tennis. Owner: Valetine & Bentley Silk Co., Newton, N. J.

67,665. Woolen piece goods. Mark: Arden serge 1044. Owner: American Woolen Co., Jersey City, N. J.

68,071. Hosiery. Mark: Chas. Chipman's Sons, Eaton, Pa.

67,798. Silk piece goods. Mark: Brilliant. Owner: The Brilliant Silk Co., New York.

68,195. Unbleached cotton goods. Mark: Plaza. Owner: Victor Mfg. Co., Greenville, S. C.

65,466. Hosiery. Mark: Cinderella. Owner: Taliaferro & Sherwood, New York.

67,093. Embroidery floss. Mark: New Era. Owner: Fishel & Gorman, Brooklyn, N. Y.

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